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Inaugural Address SIC ITUR AD ASTRA

*Delivered to the Students of the Faculty of Medicine in the University of Manitoba**

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I FEEL much honoured that it has fallen to my lot to bid you welcome at the commencement of another session. Some of you look forward with eagerness to the end of your undergraduate career. Others of you, armed with forceps and with scalpel, having passed the strait gate of entrance, are now faring forth on the narrow way that leads to graduation. To you it seems no doubt a quiet haven where you may rest at anchor after a more or less stormy voyage. It is good for youth to have illusions. Whatever stage of progress you are at, you are now one and all initiated into the brotherhood of students of medicine; may you remain in it all your lives. It is however to those who are commencing the journey that I wish to speak. Perhaps you will bear with me for a few moments while we get our bearings, and take stock of our position.

You wish to learn the phenomena of health and disease, the structure and workings of the human body and its parts; how to preserve a state of health and how to interfere in cases of disease. That is one part of your aim, and no mean part either. It is a programme that calls for your whole-souled devotion, but it should not be the entire story. An institution which can teach you this need not be a university, it need be no more than a technical school. Your university offers you much more than this. It is yours to say how much you

will accept. "All education has two sides. It is meant to impart the knowledge, the skill, the habits of diligence and concentration which are needed to secure practical success. It is also meant to form character, to implant taste, to cultivate the imagination and the emotions, to prepare a man to enjoy those delights which belong to hours of leisure, and to the inner life which goes on, or ought to go on within his own breast." If during the forthcoming years you acquire knowledge and skill, habits of diligence and concentration, that and nothing more, you will do well. You will ensure practical success. You will at least have learned your future life's work. But do not lightly overlook the other side of your education. It is that which stamps the university mind.

If you look over the programme of studies you will find no mention of these latter aims. There is no professor of character-formation, no lecturer on taste-implantation. How then are these accomplishments to be acquired? These must come from yourselves. You must develop them from within. The university will give the opportunity, it is for you to seize it.

Everything depends on your personal viewpoint. If you limit yourself to learning the art of medical practice, you will have your reward; if you aim to make the most of your personality along medical lines, the opportunity is boundless. And first you must have a healthy body. You must play games. But remember they should be games, and everyone should

* Abstract of address delivered at the opening of the session, October 4, 1926.

take part. I have no sympathy with the worship of athletic prowess as an end in itself; of the physical, mental and moral value of exercise there can be no doubt: one learns to play for the side not for oneself: to value the team more than the individual, to sacrifice one's own for the general good.

But the whole lesson of civilization is that the mind is greater than the body. "Mind is the measure of the man." It is especially during your student days that the opportunity comes to form habits of mind, to develop intellectual tastes and interests that will stand you in good stead as long as life lasts. Cultivate breadth of vision. Keep up your interest in the natural sciences. You cannot possibly remain abreast of all the new discoveries, but maintain such a working knowledge of them that you can show a sympathetic understanding, when new discoveries are explained to you.

In physics and chemistry we are verging on momentous revelations: the structure of the atom is being laid bare, and the achievements of the chemist in the present day make the dreams of the alchemist but feeble imaginings. In biology the details of evolution furnish a thousand intriguing problems; the transmission of acquired characteristics is no longer denied with the dogmatic positiveness of Weissmann. Psychology is still almost a *terra incognita* for the explorer. The study of medicine is so fascinating, and so apparently comprehensive that it is easy to find mental repletion within its limits. At all costs avoid that pitfall. Narrowness of outlook is a deadly sin; it leads to mental arrogance, to intolerance of the opinions of others, to intellectual conceit. The greatest asset of a cultured mind is the conviction of its own limitless ignorance. "We see the wider but to sigh the more."

But breadth of view must have a time relationship also. The present day is too much with us. If we think of the past at all it is apt to be in some such terms as "Let the dead past bury its dead." The past is never dead. The centuries that are past are more vital than the moment that constitutes the present. How can we understand the human body except in the light of its development? How can we interpret the present but in the light of the past? How can we work for the future if we know nothing of that which has gone before?

Unless we know something of history what is to prevent us dissipating our energy in schemes proved futile a thousand times? Even in our chosen field of medicine, the same specious fallacies repeat themselves in protean shape, "If you would discover something new, read the ancients."

Along with breadth of view you must be possessed by a passion for truth. Hitherto your knowledge has come chiefly from accepted authority. From now on authority must carry less weight with you. You must accept no statement, believe no dictum that either cannot be demonstrated, or does not make appeal to your reason. From to-day, the ultimate authority is your own reasoning mind. If you will seek truth and follow it, the most frequent thought in your minds, the most ready phrase upon your lips will be, "I do not know." It is a great sentence. Use it often. It will stimulate you to search for light in the dark places of the mind; it will preserve that humility and receptiveness of understanding which are essential to growth in mental stature; above all it will preserve the sense of loyalty to your own intelligence. The late Viscount Morley who was accounted in his day the greatest master of reasoned English prose has painted a sombre picture of the intellectual hypocrite.

"Gifts of understanding are numbed and enfeebled in a man who has once played such a trick with his own conscience as to persuade himself that, because the vulgar are superstitious, it is right for the learned to earn money by turning themselves into the ministers and accomplices of superstition. If he is clever enough to see through the vulgar and their beliefs he is tolerably sure to be clever enough from time to time and in his better moments to see through himself. He begins to suspect himself of being an impostor. That suspicion gradually unmans him when he comes to use his mind in the sphere of his own enlightenment. One of really superior powers cannot escape these better moments and the remorse that they bring."

If you are to secure harmonious development of your whole personality, it is necessary to round out not merely the intellectual, but the emotional side of your character. Here I am conscious of skating over thin ice, and shall do so with circumspection. There is one emotion which is apt to overshadow the others at your time of life. Osler has advised the student to "put his affections in cold storage" for the period of his undergraduate days. I rather fear that the idea has been sacrificed to catchiness of phraseology. We "cannot praise a

fugitive and cloistered virtue." Moderation and self-restraint should be the ideal rather than utter suppression. But in so far as it calls upon you to eschew aimless philandering the advice is excellent. Too much of the average undergraduate's time is frittered away in conversational froth and so-called social relaxation. There are, however, other emotions which will be stirred; there is wonder, reverence, indeed awe, as you contemplate the marvellous structure and complex mechanism of the human frame. Pity and sympathy will move your hearts time and again; admiration will stir you to the depths as you see some hero face with quiet courage and resignation "the slow necessity of death." If you have the seeing eye, the hearing ear and the understanding heart, it will not be long before you count yourselves rich indeed in the possession of health and opportunity. The man who has studied medicine has never justification for repining.

Now, what practical means can we adopt to secure a well-rounded personality? Precision and accuracy are the essential weapons for cultivating that love of truth which is inseparable from a well-balanced judgment. Breadth of vision can hardly be acquired apart from a study of history. That word "history" must be interpreted in the widest sense, and especially to the student of medicine would I commend the history of his own science and art, and the biography of the great men who have gone before us. There are names like John Hunter and Joseph Lister which are imperishable, and there are many less resplendent whose lives are none the less attractive because they shone less brightly. Pasteur, though not of the guild of medicine, has laid us one and all under an inextinguishable obligation. Such a life as that of Osler is brimful of inspiration for the student of medicine whatever his age. The Gideon Grays of the profession have led lives of quiet, unfailing fidelity, beside which the career of many a successful consultant is dim as a rushlight. Some of them live for ever in the pages of John Brown or of Balzac. You will see that I have tacitly assumed that you must read. Whatever the urgency of your immediate studies, however pressing those inventions of the devil known as examinations may be, never let a day pass without at least

half-an-hour devoted to reading outside of your immediate work. Read books not magazines. Magazine reading is a poison insidious as morphine. There are so many good books to read that it is a thousand pities to waste time on those which are poor in substance, or trivial in style. For many of you I trust, reading will become your main hobby. If possible have another hobby for hours of leisure.

There will come occasions when the urge of work seems almost overmastering. All of you will not feel this; the best of you will endure it at times, but

"nec semper arcum tendit Apollo."

Let there be some change of occupation to which you can turn when the mind is jaded, for most of you will learn that change of occupation is a better rest than idleness. Each of you knows your own bent. To many of you music will be "the balm that brightens all." It is the peculiar province of music to awaken emotions too subtle and various for the coarser utterance of words, and therefore to fill the mind with feelings, delightful indeed and deep, but from their very nature unutterable in words, and inexplicable except by sympathy. Poetry which is the music of speech, has a like power to meet every mood, to fire the imagination, to quicken the faltering step, to smooth the care-furrowed brow, and to minister calm to the troubled spirit.

There are other branches of art such as painting, sketching or photography which appeal to the eye, rather than to the ear, and the mechanical crafts such as leather work, wood-carving or gardening call for the use of the hands. There is assuredly no lack of such interests.

And now as regards those whose privilege it will be to instruct you. Do not look upon them as pundits who have reached the topmost pinnacles of erudition and sounded the deepest wells of knowledge. Do not think of them as men whose judgment is unerring, whose actions are infallible. They are students of medicine even as you are, only they have proceeded a few steps further along the road. Each is "a picker up of learning's crumbs." Each is eager

*"To follow knowledge like a sinking star
Beyond the utmost bound of human thought."*

But do not expect them to solve every problem, to resolve every riddle you encounter. There is much that is hidden from their eyes, much of which they are as ignorant as yourselves. Many of the trials that will beset you however, have been met and overcome by them, and you may depend at all times upon their sympathetic aid in your difficulties. There are no professional trade secrets among us; every one counts it a joy to put his knowledge at the disposal of all.

You are commencing to-day a journey brimful of interest. At every turn you will have a chance to show your mettle. Each day will

bring hopes and fears, triumphs and disappointments; the joy of success, the sorrow of failure. You will have moments of elation, hours of suspense, days when you seem to make no progress, when after hard toil you seem almost to have slipped backward.

"My life is a fault at last, I fear—
It seems too much like a fate, indeed!
Though I do my best I shall scarce succeed—
But what if I fail of my purpose here?"

It is but to keep the nerves at strain—
To dry one's eyes and laugh at a fall,
And baffled, get up to begin again,—
So the chase takes up one's life, that's all."

An Address

ON

SEPTIC INFECTIONS OF LUNGS AND BRONCHI*

BY DAVID A. STEWART. BASED ON A STUDY MADE IN ASSOCIATION WITH
JOSEPH E. PRITCHARD, AND EDWARD L. ROSS

Manitoba Sanatorium, Ninette

TO the melancholy Jacques, the life of man falls into seven acts or ages, from "the infant mewling and puking in the nurse's arms," to the "Last scene of all that ends this strange eventful history." That is the life of man *socially* considered. To Touchstone, the Jester, the ages are but two:

"And so from hour to hour we ripe and ripe,
And then from hour to hour we rot and rot,
And thereby hangs a tale."

That is the life of man *physically* considered; first perfection, then putrefaction; first development, then decay. And just about all that our very wonderful medical science can do is to safeguard a little the riping and riping, and hold back a little the rotting and rotting.

Few forms of disease fit Touchstone's blunt Saxon more aptly than the septic infections and chronic suppurations of the respiratory tract, upper and lower. Carious teeth, pyorrhea, cheesy tonsils, dripping noses, oozing sinuses, bronchial inflammations, bronchiectasis,

lung abscess, gangrene; thus from hour to hour we rot and rot, and thereby hangs this tale.

Of all the symptoms of disease, at all times and in all people, which are the commonest? Perhaps cough and expectoration. And of all symptoms of disease which are the most neglected? Again, the most likely are cough and expectoration. So common are these symptoms that people consider them scarcely pathological, but almost natural. In the old teaching, phlegm had its place with blood, yellow bile and black bile, as one of the four constituent humours of the body, harmful only if in excess. Yet we know that cough is always pathological, and purulent sputum is also.

When a new medical generation has studied cough as closely as the present one has studied abdominal pain, it may be found that all chronic coughs, may be pretty much divided into three groups. Of these, tuberculosis will likely form the smallest, the septic infections the largest, and other causes, cardio-renal conditions chiefly, will fall between these two in frequency.

Septic broncho-pulmonary infections drift

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into the Manitoba Sanatorium at the rate of 36 a year, about 4 per cent of all admissions for diagnosis and treatment. And these cases are by no means in an early stage. All are well-established and troublesome, and, indeed, symptoms have already persisted for an average of six years. Early stages of all diseases are more common than late stages, though in our strange and illogical system, or lack of system, of applying medical science to the needs of people, early stages are seldom brought for treatment. "Sick headache," failing sight, stiff joints and the earlier stages of septic broncho-pulmonary infections are more often put up with in silence as "constitutional," or "ills that flesh is heir to," than mentioned to the doctor. When at length they are brought for diagnosis, they are likely enough to be simply thrown on that convenient heterogeneous scrap-heap, "chronic bronchitis," and a new cough mixture prescribed. *Chronic bronchitis is usually bronchiectasis*, and bronchiectasis is not a rare condition but a common one. If all the chronic, septic, broncho-pulmonary infections, early and late, were recognized and recorded these would be considered one of the very common disease entities in every community. Some of the commonly overlooked types may be illustrated, as follows:

CASE A

A farmer of 45 visited his wife who was a sanatorium patient fairly frequently, and brought his daughter for examination. It was not until his sixth visit that in a jocular way he said that he himself had



FIG. 1.—Illustrating Case A.

coughed and spat for years; might he not have something? He could work hard every day but had a troublesome cough, especially in the morning, and if he stooped pus ran out of his mouth. The bronchiectatic sacculations of his left base were so large that they showed even in an ordinary film, and when outlined by iodized oil were like a bunch of large white grapes. (Fig. 1.)

CASE B

A man of 54 complained that cough, expectoration and dyspnea had increased gradually during the past twenty years. In the past few years strength had failed also, and he now was unable to work. Ordinary chest films indicated chiefly emphysema, and not a single abnormal density, but the little iodized oil that was retained showed very typical bronchiectatic sacculations.

CASE C

A man of 22 had several attacks of tonsillitis and one of quinsy. Six months before he came in, he "caught a cold" which lasted two months, and then, after an interval, recurred. He lost weight and strength, and was sent to the sanatorium as likely tuberculous. Worked out in its details, this case was typical of bronchiectasis, and iodized oil showed in the left base large sacculations of the "glove finger" type.

ETIOLOGY

What are the common causes that can be considered responsible for these distressing conditions?

First of all, perhaps, are septic mouth, throat and nose conditions, carious teeth, badly kept, dirty teeth, teeth with root abscesses, pyorrhea, cryptic and diseased tonsils, post-nasal disease, and suppurations in the various accessory sinuses, especially in the antra. The lung bases are veritable cesspools for the upper air passages, and septic infections of the bronchi, it may almost be said, vary directly with the conditions of the mouths above them.

The mouth is missed, or its significance is missed, in many examinations. A doctor assured me that the teeth of a woman, who had a troublesome cough, profuse expectoration, chest pain and debility, were all right—must be, because she had never complained to him of toothache. "Why," the woman broke in, "I haven't a sound tooth in my head," and a glimpse showed as present in her mouth all the elements that almost necessarily, sooner or later, would cause just what she was suffering from—septic broncho-pulmonary infection. Teeth, gums, tongue, tonsils—if any of these are unclean, the mouth is unclean, and if the mouth is unclean so are the food eaten and the air breathed.

Just what the mouth is like, it certainly is the doctor's business to know. The number of

filthy, neglected mouths is appalling. Health with such is an impossibility, and many a shining gold-filled mouth, with bridges and crowns and elaborate dentistry, is simply a whited sepulchre, fair to outward appearance, but below the surface full of dead men's bones and all uncleanness. The great inlet and outlet for infections is the mouth. Look first for the causes of bronchial infections above the clavicle. When you see a very badly kept mouth look for bronchial symptoms and signs, and if you don't find them to-day you will to-morrow.

The second place, or perhaps the first place, among the causes of the chronic broncho-pulmonary septic evils must be given to the acute respiratory diseases, such as pertussis, influenza, broncho-pneumonia, measles and tonsillitis. The common history is that the sufferer has coughed and spat "ever since the whooping-cough," or since the "flu," or "ever since pneumonia in childhood." The number of serious ills thus referred back to such beginnings is remarkable. We have come to believe that the guilty common factor in all these conditions is the broncho-pneumonia. The following cases are illustrative:—

CASE D

A boy of 11 years coughed and spat for four months following severe whooping-cough. He was really ill, debilitated, and his fingers were clubbed. Lung roots and bases showed in plates very "dirty." Two months in bed cleared up symptoms and signs.

CASE E

A boy of 16 had severe tonsillitis in January followed by cough, and in April was still coughing and spitting. Ordinary chest plates showed a definite small area of abnormal shadow at the right lung base. Rest in bed for two months cleared up all signs and symptoms.

CASE F

A young man of 22, who worked every day and considered that he had no ill-health, came for examination because he coughed and spat every day, and could not run nor laugh without coughing and spitting. He had been born into an epidemic of whooping-cough and had coughed and spat ever since. He had the typical basal rales, typical organisms and sacculated bronchi. (Fig. 2.)

CASE G

A school boy of 15 was sent in as tuberculous, complaining of cough, expectoration and dyspnea since an attack of influenza eight years ago, and with exacerbation six months ago. Though he spat up four ounces of purulent material a day his general condition was very fair. He had typical symptoms, signs and organisms, and very gross sacculations of bronchi. (Fig. 3.)

The most discussed cause of chronic suppurations in bronchi and lungs, but by no means the



FIG. 2.—Illustrating Case F.



FIG. 3.—Illustrating Case G.

first in importance, is aspiration of infective material during general anaesthesia. The danger is necessarily greater in mouth operations such as tonsillectomy and tooth extraction, when septic foci are stirred up and very dangerous material scattered around. Crowe of Baltimore having done 3,500 tonsillectomies without lung complications shows what care may accomplish. But the essential condition is in the anaesthesia itself, which abolishes the pharyngeal reflexes and thus permits the aspiration of mouth contents.

CASE H

In a boy of 19, operated on for hernia, symptoms of lung abscess began on the tenth day, and on ad-

mission to the sanatorium two months later all signs and symptoms were typical of abscess. Pneumothorax treatment was successful.

CASE I

A girl of six, after extraction of teeth under general anaesthesia, became very ill and examination showed a tooth lodged in the bronchus with a large resulting abscess. The abscess cleared up very quickly when the tooth was removed by bronchoscope. (Fig. 4.)



FIG. 4.—Illustrating Case I.

A foreign body, such as the tooth just referred to, is well understood to be a cause of chronic suppuration in lung and bronchi. These cases may be considered comparatively rare and yet it is not unlikely that they are often overlooked and misinterpreted. An interesting question was raised when two young men, who were examined recently on account of cough and expectoration of several years' duration, gave histories of diphtheria about the time the cough began, and in each there had been a partial paralysis. Was the cause of the present trouble food or other foreign material aspirated, when the reflexes were off their guard on account of the diphtheritic paralysis?

I think that still another cause of lung abscess, and perhaps bronchiectasis also, can be made out by the help of iodized oil. That is, an empyema which discharges through lung and bronchi, and forms abscesses along its route, disorganizing also the bronchi involved. Ordinary plates show just the usual heavy shadow of pus or thickened pleura. Iodized oil injected by trachea shows against the empyema shadow the denser outline of lung abscesses.

In three empyemas dealt with in the past six months, one of three months' duration, one of six months', and one of three years', this formation of abscesses in lung, and bronchiectatic saccululation, were very clearly demonstrated.

CASE J

A girl aged eleven had cough and expectoration for three years before admission. Plates showed (Fig. 5) ordinary empyema type of shadow. Iodized oil showed (Fig. 6) two well marked lung abscess cavities in addition.



FIG. 5.—Illustrating Case J.



FIG. 6.—Illustrating Case J.

BACTERIOLOGY

These septic infections of the lungs and bronchi have a new bacteriology. There are, no doubt, many harmful organisms at work in the

whole respiratory tract, upper and lower, among them the usual types of staphylococcus, streptococcus, pneumococcus, the organisms associated with influenza, etc. But for the worse lesions of the lower bronchi and lungs, at any rate for the putrid types, responsibility would now seem to rest chiefly on spirochaetes of varying forms, including Vincent's, and accompanying fusiform bacilli. These were found and described as much as sixty years ago. Indeed, it is about time for some medical archæologist to attempt to shew that the twisted serpent of the emblem of our profession, the Caduceus, is really a spirochaete rampant. In the past few years a considerable literature has grown up about these organisms. They are commonly present even in fairly well kept mouths, and tooth scrapings may show them plentifully on a slide, without apparently much evident harm. In the lower bronchi and in lung tissue, however, they seem responsible for many and gross lesions. They were found in the carefully collected and washed discharges from the lungs of nearly all the more advanced cases in the series on which this paper is based; and they were not found in the lung discharges of tuberculous patients except when there was very definite evidence of mixed infection. David T. Smith, who has done much to revive interest in these organisms, and to fasten the guilt of broncho-pulmonary lesions upon them, produces lung abscesses in mice, guinea pigs and rabbits with scrapings from the alveolar borders in pyorrhœa. He suggests that syphilis with aneurism caused by the burrowing of the *Spirochaeta pallida* in arterial walls may have a parallel in bronchiectasis and in the weakening of bronchial walls, also by the action of these micro-organisms.

If these common mouth organisms sometimes become malevolent in lung and bronchi, the question naturally is wherefore and under what conditions? Are they always virulent in the lung bases or harmless except under certain conditions? Must the bronchus be damaged and its natural resistance lowered before harm will be done? If damage is necessary, what causes the damage? Is it a general impairment of bronchial cells by the toxæmia of acute disease, or damage by strain of cough, or deterioration by broncho-pneumonic inflammation? Naturally, it would be of great importance to know how this particular stable door is opened and the horses

stolen. At any rate, some progress has been made if definite organisms have been found guilty, and definite kinds of respiratory disease, e.g., broncho-pneumonia, implicated also.

COURSE

These septic infections of bronchi and lung may be acute and rapidly destructive, but are usually chronic and steadily progressive, with many exacerbations. Sixty such cases, seen in the past two years mostly for diagnosis, had lasted already from two months to thirty years, the average being a little over six years, and most of them at that were just getting well under way.

An English writer, Agassiz, within the past month has described what he calls "non-tubercular fibrosis of lungs in children," which he sees not infrequently, almost always classed as tuberculosis. He finds it in children without family history of tuberculosis, and usually following, or seeming to follow, measles or whooping-cough accompanied by broncho-pneumonia.

These children have troublesome and spasmodic cough, especially in winter, with expectoration small in amount, but increasing and sometimes with blood streaks. There is dyspnoea, cyanosis, and in some cases clubbing of the fingers. The children so afflicted do not develop well, are under-sized, pigeon-chested and of poor general physique. He finds dry, leathery, creaking râles at the lung bases, variable from time to time. X-ray plates show slight but characteristic shadows.

The symptoms which Agassiz is observing are undoubtedly the early stage of an infection which, in later life will manifest itself as septic broncho-pulmonary disease, most frequently as a bronchiectasis. Contrary to common belief, tuberculosis is not so very often traceable directly to measles and pertussis and pneumonia.

Besides exacerbations in the long course of these diseases there are complications also, long chains of various septic events, such as pneumonia, tonsillitis, sinus infections, arthritis, appendicitis, otitis media, bone suppurations, erysipelas, etc. In the sixty cases, which averaged six years' duration up to the time of record, there had been 240 such complicating illnesses, an average of four for each sufferer, or one every eighteen months. The very chronic course of these diseases may be illustrated as follows:—

CASE K

A woman of 32 has coughed and spat since early childhood, her mother's idea being that she "caught bronchitis" from another child from whose arm she was vaccinated. She was able to work until six years ago, when, following two pneumonic attacks, she was unable to continue work. Her troublesome cough and frequent foul-smelling expectoration alienated even members of her family, and life, as she said—at 32—was not worth living. Such a simple measure as postural drainage, emptying out all at once and intentionally, rather than little by little and involuntarily, gave her four-hour periods free from cough and expectoration, and smell, and made life a little better worth living; but it did not cure the disease, nor lessen it.

CASE L

A man, now 61, had pleurisy at 17, nasal polypi with purulent discharge for twenty years, cough and expectoration for most of that time, worse for three years and very much worse in the past six months. He has lost weight, strength, spirit and all pleasure in life; has frequent spells of cough, and spits up four ounces of foul-smelling sputum a day. Posture, pneumothorax and neo-salvarsan were tried, so far with little effect. So, sadly, he staggers on. (Fig. 7.)



FIG. 7.—Illustrating Case L.

CASE M

By the age of five a little girl had chronic, troublesome cough and expectoration and two running ears, the sequelae of several acute respiratory diseases. In later years she had several pneumonias, abscess of the jaw, infected antra, erysipelas and exacerbations innumerable. At 27, she was weak and miserable, weighed 80 pounds and was pretty well tired of the struggle. In ordinary x-ray films fifteen fluid levels could be counted in as many bronchiectatic cavities in the right base alone, and, with a little iodized oil that was retained, forty-three could be counted. Spirochetes disappeared temporarily after salvarsan was given, but with no alleviation of distress. (Fig. 8.)

And so from hour to hour they rot and rot.

DIAGNOSIS

As already stated, these bronchial infections have a new bacteriology. They have also a new bronchography. It is scarcely too much to say



FIG. 8.—Illustrating Case M.

that iodized oil is as useful and as necessary in the study of the bronchi as barium is in the study of the intestine.

How should iodized oil be given, and how generally should it be used? Certainly its application should not be limited to the bronchoscope. Archibald and Brown have reported harm from its use. Those who have used the oil without the bronchoscope report few mishaps. The iodized oil is easily given. It may be tipped over the epiglottis into the trachea by a suitable syringe, or even deposited on the base of the tongue and aspirated or allowed to trickle down. The wonder is how easy it is to get this substance into the trachea and bronchi. There is no reason why any man who has fair knowledge of bronchial conditions, and interest in them, and good x-ray plates available, should not do this diagnostic work, and do it well.

When a man comes complaining of cough, purulent expectoration, pain in the chest, dyspnoea, fever, loss of weight and strength and even hæmoptysis, and the stethoscope shows slight abnormal chest sounds, and the x-ray plate some abnormal shadows, what is he suffering from? Tuberculosis? Not necessarily; but every one of these symptoms belongs to tuberculosis. Yes, and every one belongs also to the group of non-tuberculous bronchopulmonary infections. Exactly the same list of symptoms for two distinct diseases; how shall we differentiate? Certainly not by adding symptom to symptom until a total is reached.

It must be by applying symptom to symptom until a picture is painted. With the same pigments on his palette an artist may paint a portrait or an autumn landscape. Out of such symptoms as cough, expectoration, dyspnea, fever, debility, hæmorrhage, chest pains, loss of weight, abnormal chest sounds and shadows can be made typical pictures of either the septic broncho-pulmonary infections or of pulmonary tuberculosis.

TREATMENT

The first principle in the treatment of these septic conditions is, when possible, to remove causes. Carious teeth should be attended to,

abscesses cleared up, foci in sinuses dealt with, pyorrhœa treated, diseased tonsils excised; in short, the upper respiratory tract generally tidied up. All this should be done even though all possible harm seems already done.

The main reliance in the earlier stages is upon rest. If applied intensively within the first few months most of the ordinary infections will clear up, but it must be applied early and must be real rest in bed. Merely quitting work or dawdling about, which often passes for rest, has little value, moral or therapeutic, but what real bed rest can do in this and other conditions is a constant wonder

DIFFERENTIAL DIAGNOSIS—SOME CONSIDERATIONS

	<i>Septic Infections</i>	<i>Pulmonary Tuberculosis</i>
<i>Etiology:</i>	Contact history relatively unimportant. Commonly follows pertussis, measles, influenza, broncho-pneumonia, etc. Onset very variable.	Contact history very important. Rarely follows these. Onset usually insidious.
<i>Cough:</i>	The chief symptom, and always present. Much at early stages. Very troublesome in late stages.	Not the chief symptom and not always present. Little or none at early stages. Very troublesome only with mixed infection.
<i>Expectoration:</i>	Always present. In early stages very variable; may be little or profuse. In late stages almost always profuse.	Not always present. In early stages slight or absent; not a chief symptom. In late stages may be slight. Profuse usually only with mixed infection (tuberculous plus septic). Rarely bad smelling; only with mixed infection.
<i>Dyspnea:</i>	Often bad smelling. A chief symptom, always present, usually marked. Consistent with fair condition. Can be dyspnoic but not ill. Dependent on extent of lesion.	Less usual and less marked. Not usual with good condition. If dyspnoic likely ill. Dependent on toxæmia chiefly.
<i>Hemoptysis:</i>	Blood in one-third to one-half cases. Large amounts relatively uncommon.	Blood in about one-third. Large amounts more common.
<i>Pleurisy:</i>	True pleurisy uncommon.	Common.
<i>Other Chest Pains:</i>	Common, troublesome, basal, movable, occurring on both sides.	Less common, slighter, often apical, more localized, generally one-sided.
<i>Toxic Symptoms:</i>	Debility, loss of weight, etc., common, after disease established.	Debility, loss of weight, etc., common, even at very beginning.
<i>Bacteriology:</i>	Spirochetes and fusiform bacilli commonly found. May be specific.	Tubercle bacilli commonly found. Are specific.
<i>Lesions:</i>	Usually basal.	Usually apical.
<i>Sounds:</i>	Early: basal râles, creaking, leathery. Later: noisy, musical or gurgling sounds.	Early: apical, true râles. Later: true râles—small, crepitant, except with mixed infection.
<i>X-Ray Signs:</i>	Usually basal; in early stages "dirty." May be slight with gross symptoms. Ordinary films almost useless. Iodized oil as useful as barium is in bowel.	Usually apical; in early stages flocculent. May be gross with slight symptoms. Iodized oil of limited value.
<i>Complications:</i>	Of septic type: mastoid, otitis, appendicitis, bad sinus and mouth conditions, etc.	Of tuberculous type: pleurisy, spread to, other organs—larynx, intestines, etc.
<i>Course:</i>	Chronic and progressive.	Chronic but with remissions and exacerbations

to the comparatively few physicians who ever give it a persevering trial.

Heliotherapy, which is not a specific cure for anything, but a general tonic and an adjuvant to cure—though a wonderful tonic and adjuvant if rightly used—may be a help, especially in the earlier stages.

Posture, to promote drainage, is a very useful measure in almost all stages. When it is hard to cough secretions *up*, work with gravity rather than against it; stand the patient pretty much on his head and have him cough *down*. Bronchiectatic cavities constantly filled cannot very well be expected to shrink, but, if kept well emptied, there is at least a better chance of their doing so. Cilia which have deteriorated in constantly distended bronchial sacs, Chevalier Jackson thinks, may recover somewhat if the bronchi are kept emptied.

In the earlier stages then, emptying out secretions by postural drainage is useful. In even late stages it may make life once more worth living for a distressed sufferer by giving him intervals of several hours without cough, sputum, or offensiveness. Patients can make a fine art of emptying out their secretions, but if gravity and cough will not accomplish this the bronchoscope can help. It seems to me, however, that a staff of doctors and nurses spending a half day each week, as is done in some clinics, emptying out the foul secretions of a dozen chronic bronchiectatics is a very large expenditure of time and skill for very small returns in the way of cure.

The new bacteriology of septic infections, the finding of strong circumstantial evidence, and perhaps even direct evidence, against certain spirochaetes, leads naturally to the treatment of these conditions by neo-salvarsan. Under this treatment the spirochaetes do disappear temporarily. It would seem fairly established that there has been benefit, more or less permanent, in some earlier cases, and those who have persevered, report improvement in even the far advanced. Autogenous vaccines, it is said, have more effect if given after a course of salvarsan.

The new bronchography has led also to new treatment, but whether successful or not remains to be seen. Bruce Whyte of Battle Creek thinks iodized oil in diseased bronchi is of therapeutic value. Archibald and Brown, on the other hand,

very much doubt its value and are afraid it may even do harm.

The septic infections of the lungs and bronchi, which have had the advantages of a new bacteriology, a new bronchography, a new mode of drainage by the bronchoscope and new therapeutic agents in neo-salvarsan and iodized oil, have also the very great advantages of new surgery, in what may be called drainage by collapse.

The pleura is more likely to be free, and so collapse more likely to be possible, in bronchiectasis than in abscess, but, if possible, is more likely to be of value in abscess than in bronchiectasis. A bunch of sacculated bronchi may be pushed into a corner by pneumo-thorax but may still remain sacculated.

In the same way, pressure made upon the lung by cutting ribs and collapsing the chest wall (thoracoplasty) or by cutting the phrenic nerve and allowing the paralyzed diaphragm to rise (phrenicotomy) may be disappointing, because even a good collapse of lung by one or more of these means does not always or altogether remove the disease. However, it does lessen symptoms and sometimes effects a real cure. Collapse by some means should be at least considered at the middle stages of most of these septic infections.

The last stage is desperate and, like other desperate diseases, requires desperate remedies. When the lung lobe is honey-combed with cavities oozing pus, or with thin-walled bulging bronchi distended with pus, or when lung and bronchi are equally bad, there seems to be just one way of reaching anything like cure and that is by destroying the lobe. For these distressing and refractory conditions Graham of St. Louis uses the cautery; actually, the soldering iron. In general, in forty-five operations, his results have been better with abscess than with bronchiectasis. Deaths following the operation closely have been 7 per cent, and deaths at all intervals and from all causes, not necessarily due to the operation, 24 per cent. On the other hand, 69 per cent have been freed from symptoms. Considering the horrors of these late stages, the operation seems to offer chances that are very fair.

The best cure however, for most ills is prevention, and that is very true of the ills we have been considering. Physicians, like other sensible

people, admit this principle very readily in theory, but its practice is a different matter. The whole tradition, training and experience of our profession has been in cure and not prevention. We have not been architects and builders of beautiful temples of health, but patchers up and piecers together and general tinkers of indifferent health structures that have become dilapidated or fallen in ruins. When we get our true place in the scheme of things, when "doctor" will really mean "teacher," when prevention will really be considered a better practice than cure, a good many of these distressing septic conditions will be prevented, and so will not need cure. Better mouth care, and mouth care much more general among all the people, is of great importance. Before a general anæsthetic the mouth should be well prepared. It is of at least equal importance that acute infectious diseases of the respiratory tract, especially such as are, or may be, accompanied by broncho-pneumonia, should be given a decent period for convalescence. An extra few days or week in bed may prevent many horrors.

A short time ago I saw a little girl of eight, under-sized, sallow, unable to go to school, coughing up a cup of foul smelling sputum each day; unwelcome anywhere, even in her own home; likely incurable, growing up into a life almost as distressful as that of the mediæval leper with his clapper and bell and his warning cry, "Unclean." Long before the riping has finished the rotting has begun. This pitiful little girl has coughed for five years, since she had whooping cough at three. An extra week or two of convalescence might have prevented this horror. Even at the end of the first year two months in bed might have stopped it. Now, nothing can stop it but death, which, as she gets older, she may often long for. We will cure these conditions, of course, if we can; but prevent them *we must*.

SUMMARY

1. Septic infections of the lungs and bronchi are not new nor rare, but are common, indeed, very common. Bronchiectasis is common. A large percentage of chronic bronchitis is bronchiectasis. One of the commonest of all

disease conditions is chronic cough, and for one-third to one-half of chronic coughs these septic infections are responsible.

2. They follow upon neglected "colds," acute bronchitis, measles, tonsillitis and sinus affections of most sorts. But the more troublesome of them follow most commonly and notably pertussis, influenza and broncho-pneumonia. Perhaps, the broncho-pneumonia is the essential element, the common factor. Is it true that these conditions come like following waves after such epidemics as that of 1918? This would explain their forcing themselves especially on our attention at this time. They are definitely associated with septic mouth, nose and sinus conditions of all sorts, and may be caused by the aspiration of mouth contents during anæsthesia.

3. A new bacteriology is being worked out for them. Certain spirochætes and fusiform bacilli, which seem not very harmful as mouth-dwellers, become pathogenic under certain conditions and seem to be the specific cause of putrid lung lesions.

4. There is a new diagnostic measure of great importance in iodized oil. Differentiation between septic infections and tuberculosis is not difficult if all facts are elicited and all details methodically considered.

5. Their course is very variable, but they are usually progressive, chronic, damaging, debilitating, distressing and, not infrequently, fatal.

6. Rest in bed is absolutely the most important measure if employed in the early stages, but is of little value in the late stages, except as a palliative. Drainage by posture is useful in the early stage but only palliative when used late. Early drainage by the bronchoscope may be of great value. Midway between the early and the late stages treatment by collapse by the employment of pneumo-thorax, phrenicotomy and thoracoplasty should be considered. Since spirochætes are implicated, neo-salvarsan is suggested. It may be of use, especially in the earlier stages. In the late stages, the disease being desperate calls for desperate cures, such as destruction of the diseased lobe.

7. Better than all cures is prevention.

An Address
ON
SPONTANEOUS GANGRENE OF THE EXTREMITIES*

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DURING the past few years lesions affecting the blood vessels of the extremities have been well differentiated and the clinical syndromes associated with them well recognized. It may be said, however, without much fear of contradiction that most things concerning the etiology of the changes in the vessels leading to spontaneous gangrene and many things concerning the results of these are still in a state of distressing uncertainty.

Clinically, spontaneous gangrene occurs in the old and the relatively young, thus justifying the clinical classification of senile and presenile gangrene. These are dependent upon entirely different processes, one degenerative in character, the other inflammatory—an arteritis, or because of the almost constantly associated involvement of veins—a thrombo-angiitis.

According to Marchand, the term arteriosclerosis includes all those changes occurring in an artery which lead to a thickening, especially of the intima; to degenerative changes (fatty degeneration); to sclerosis and calcification (including calcification of the media); also inflammatory and productive processes.

Clinicians and pathologists have different criteria regarding arteriosclerosis. To the clinician arteriosclerosis indicates a rigid, non-compressible, pipestem-like artery. The pathologist on the other hand is concerned mostly with the earlier changes of proliferation followed by degeneration or the reverse. It is generally admitted that in arteriosclerosis the principal early changes occur in the media. In advanced cases the adventitia may also be affected. There is no unanimity of opinion, however, concerning the sequence of these changes. While some regard the changes in the media and

internal elastic lamina as primary and those in the intima as secondary, others think the reverse. These differences of opinion may be due in part to variability in the arrangement of the musculature and elastic tissue in different parts of the arterial tree.



FIG. 1.—Normal pattern of the arterial tree of the foot.

The changes associated with presenile gangrene are definite. There is some confusion, however, in nomenclature because of the terms which have been introduced. In 1879, von Winiwarter published the pathological findings in cases in which practically all the arteries of the leg were obliterated by a chronic proliferative process originating apparently in the intima. He gave the name of endarteritis obliterans to this process. This lesion un-

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doubtedly is the same as that which we now know as thrombo-angiitis obliterans, characterized by an inflammation of the walls of the vessels, associated with thrombus formation, with subsequent vascularization, organization and canalization of the thrombus.

Pathologically, arteriosclerosis and thrombo-angiitis are distinct. The term endarteritis obliterans probably might be discarded to advantage. It has, however, the influence of long usage. In thrombo-angiitis, arteritis and peri-arteritis (phlebitis and periphlebitis) are the initial lesions. In the evolution of the disease healing is the rule, the products of the inflammatory stage being replaced by fibrous tissue.

In the series upon which this study is based there are 139 cases of spontaneous gangrene of the extremities, the records of which are complete enough to be accepted. There are 47 cases of arteriosclerosis, 43 cases of arteriosclerosis associated with glycosuria, 27 cases of gangrene occurring in diabetics in which arterial changes, if present, were not pronounced enough to attract attention, 14 cases of thrombo-angiitis obliterans, 1 case of scleroderma, 7 cases in which arterial changes may

have been a contributing factor in the gangrene but infection played the principal part.

ARTERIOSCLEROTIC GANGRENE

The clinical phenomena associated with arteriosclerotic gangrene and thrombo-angiitis are so well known that there is but little need for their consideration. I would like, however, to quote from the original description of Pott concerning the onset and progress of arteriosclerotic gangrene. This description appears in his *Surgery*, vol. ii, published in 1819. The description is found in a chapter entitled "Observations on the Mortification of the Toes and Feet." In this appears the following:

"The powers and virtues of Peruvian bark are known to almost every practitioner of physic and surgery. Among the many cases in which its merit is particularly and justly celebrated, are the distempers called gangrene and mortification; its general power of stopping the one, and resisting the other, has made no inconsiderable addition to the success of the chirurgic art; but still there is a particular species even of these in which this noble medicine most frequently fails. I mean that particular kind, which, beginning at the extremity of one or more small toes, does, in more or less time, pass on to the foot or ankle, sometimes to a part of the leg, and in spite of all the aid of physic or surgery most commonly destroys the patient.

It is very unlike to the mortification from inflammation, to that from external cold, from ligature or bandage, or to that which proceeds from any known cause, and this as well in its attack as in its progress. In some few instances it may make its appearance with little or no pain, but in much the majority of cases the patient feels great uneasiness through the whole foot and joint of the ankle, particularly in the night, even before there is any other than a small discoloured spot on the end of one of the little toes.

It generally makes its appearance on the inside, or at the extremity of one of the smaller toes by a small black or bluish spot; from this spot the cuticle is always found to be detached, and the skin under it of a dark red colour. If the patient has lately cut his nails or corn, it is most frequently, though very unjustly, set to the account of such operation. Its progress in different subjects, and under different circumstances, is different; in some it is slow and long in passing from toe to toe, and from thence to the foot and ankle; in others its progress is rapid and horridly painful. It generally begins on the inside of each small toe before it is visible either on its under or upper part; and when it makes its attack on the foot, the upper part of it shows first the distempered state, by tumefaction, change in colour and sometimes by vesication, but wherever it is, one of the first marks of it is a separation or detachment of the skin."

This clinical description of senile or arteriosclerotic gangrene is so accurate that nothing can be added. The question arises at once why gangrene is not observed more frequently in the upper extremity in arteriosclerosis. Pott's original description concerns itself with the



FIG. 2.—Injected specimen of leg and foot removed for arteriosclerotic gangrene showing imperfect filling of the vessels, occlusion of the main trunks and lack of collateral circulation.

toes and feet. But in the cases of arteriosclerotic gangrene of the feet the changes may be as advanced or more in the vessels of the upper extremity without gangrene.



FIG. 3.—Injected specimen of foot removed for arteriosclerotic gangrene. Some collateral circulation seems to have developed but it is very little.

One cannot but be struck with the frequency with which pulsation cannot be felt in either the dorsalis pedis or the posterior tibial arteries, and still no evidence of a circulatory disturbance be evident and no symptoms except some fatigue or pain on exertion.

The arrangement of vessels in the lower extremity may determine the more frequent occurrence of gangrene in the lower than in the upper extremity. Not enough attention has been paid to the extent or location of the thrombus or occlusion in cases of gangrene. Embolism or thrombosis of the popliteal artery is practically always followed by gangrene, and Heidenhain was one of the first to suggest that gangrene of this type was due to occlusion of the popliteal arteries or its branches. In eleven of the twenty cases examined by him, occlusion of the larger vessels—popliteal, anterior and posterior tibials—by thrombi, in some cases organized, was found. An examina-

tion of statistics would indicate that in 50 per cent of the cases of senile gangrene, the large vessels of the extremity are occluded. Occlusion of the popliteal artery by a recent thrombus is found in cases in which the gangrene is limited to a single toe. The possibility of a collateral circulation in these cases will be discussed after thrombo-angiitis is considered.



FIG. 4.—Foot and leg injected after removal for arteriosclerotic gangrene. Vessels difficult to inject, collateral circulation not developed, and recent thrombus found in popliteal artery.

Nine deaths occurred in the forty-seven cases of senile gangrene, a mortality of a little over 19 per cent. Three of these patients died of pneumonia, three of embolism and two of myocarditis. The cause of death in one is not stated. Twenty-seven patients left the hospital with wounds healed. The wounds of the remaining twenty were granulating, but healed subsequently.

It has been impossible to follow these cases to determine the length of life after amputation for senile gangrene, as in Baltimore we are dealing with a floating population, making a thorough follow-up difficult. In two of the cases gangrene developed in the remaining foot, one almost nine years after the first amputation; in the other case almost four years later. In the first of these a recent thrombus was found in the popliteal artery. This extended some way up into the femoral artery.

Amputation through the condyles—Carden's transeondyloid amputation—is very satisfactory in these cases. It is of interest to note, however, that in a considerable number of these cases the incision may open after removal of the stitches, necessitating traction upon the skin by adhesive strips in order to cover the stump. Death is not frequently caused by the operation, but is due to extension of the vascular disease or a terminal infection.



FIG. 5.—Intermittent claudication showing arteriosclerosis of the main vessels. The dorsalis pedis and posterior tibial pulses were lacking but this patient had no evidence of circulatory disturbance other than the intermittent claudication.

ARTERIOSCLEROTIC GANGRENE WITH GLYCOSURIA (DIABETIC GANGRENE)

Since attention was first called to the not infrequent association of diabetes and gangrene by Marshall di Calvi, the relationship between the two has been studied frequently. That hyperglycæmia with the associated metabolic changes is not alone the predisposing factor to gangrene has been conclusively demonstrated, for the severest form of diabetes running a rapid course and terminating fatally, as well as the more chronic cases, with a marked hyperglycæmia, may have no gangrene. It is probable that one errs as much in the opposite direction if one regards the glycosuria observed

in so many of these cases as merely due to an arteriosclerosis involving the pancreatic vessels and denies a direct etiological relationship between the hyperglycæmia and the gangrene.

Arterial changes are common in patients with diabetes. Grube found vascular changes in 66 out of 177 diabetics, and von Noorden in 200 out of 650 (30 per cent). Eliason and Wright have recently directed attention to this. Arteriosclerosis was present in 66.6 per cent of their cases of gangrene occurring in diabetics. In 19 cases no mention was made of it. Some of these cases dated back to 1903, and it was impossible to secure accurate data. They make the following statement concerning the association of the two. "Inasmuch as gangrene in diabetics occurs about five years earlier than in senile arteriosclerosis and 66.6 per cent of the cases in which the condition of the arteries was recorded, showed arteriosclerosis and 100 per cent of all pathological and x-ray examinations showed it to be present, it would appear that there cannot be any question but that the local arterial condition plays an important part in the causation of gangrene of the extremities in diabetic patients, and is therefore quite analogous in this respect to the senile form of gangrene."

Accumulating evidence indicates that the so-called diabetic gangrene is due to arteriosclerosis. It is dependent primarily upon the same causes as arteriosclerotic gangrene, but complicated by hyperglycæmia. The study of the series herein considered, shows that gangrene develops in the diabetic about a decade earlier than in uncomplicated arteriosclerosis. The average age at which gangrene appears in the diabetic is 54.4 years; while the average at which senile gangrene appears is 66.2 years. Eliason and Wright state that diabetic gangrene shortens life a full decade more than arteriosclerotic gangrene.

In the series occurring at Johns Hopkins Hospital there were 43 cases of gangrene in diabetics in which there were marked arterial changes and 27 cases in which arteriosclerosis was not pronounced enough to attract attention or no particular attention was paid to the arterial lesion. Arteriosclerosis was therefore noted in 61.4 per cent of the cases, a percentage which corresponds quite closely to that of other statistics. Eighteen or 25.7 per cent of these

patients died as the direct result of the gangrene. Death was ascribed to diabetic coma, to pulmonary embolism, shock following operation in one case, to lobular pneumonia, ulcerative colitis and advancing gangrene, gangrene of both feet being observed in one case.



FIG. 6.—Injected specimen of leg and foot removed for gangrene associated with Buerger's disease showing the development of a rather extensive collateral circulation. The capillaries are not injected as the injection mass does not pass into them.

Thrombo-Angiitis.—Gangrene occurring in the relatively young—the presenile type—presents quite a different picture from that just described. It may have a variety of onsets; with intermittent claudication, with symptoms referable to the deep vessels, with the appearance first of trophic changes, and an onset overlooked until the other extremity is affected. This disease is not confined to the Hebrew. One of the most striking changes in thrombo-angiitis obliterans is the extensive collateral circulation which may develop. While some collateral circulation may develop in arteriosclerosis, it is not marked. Miller and Meleney in 1925 injected the vessels of legs of Chinese which had been amputated, because of gangrene associated with a vascular change in every way similar to thrombo-angiitis observed

in this country. A roentgenogram of the injected vessels indicates the loss of the normal arrangement of the blood vessels, and in the main vessels patchy defects suggesting almost complete obliteration of the lumen at some points. In stereoscopic plates numerous arterioles may be seen which extend even to the line of gangrene. Reichert had noticed these changes two years before, but his findings were not published until later.

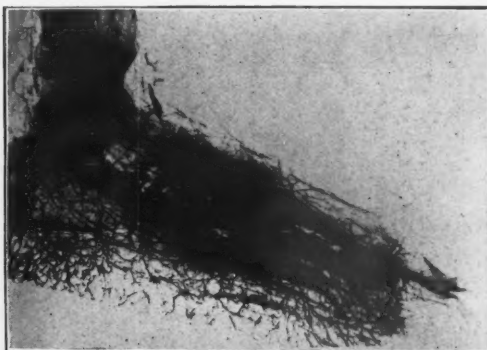


FIG. 7.—Injected specimen of foot in which amputation was done for thrombo-angiitis obliterans showing collateral circulation. At operation a recent thrombus was found in the popliteal artery.

Meleney and Miller recognized the importance of the collateral circulation, for they state that if the disease continues instead of subsiding or coming to a standstill, a contest develops between two forces: blockage of the vessels on the one hand and collateral blood vessel development on the other. There is a limit to the speed with which the collateral circulation can develop. At present one can only guess what it is that limits the speed of the disease process, but the outcome is determined by the relative speed of the two. After an equilibrium has been established following the first attack, if a second attack comes on or a dormant process becomes active again, the contest is renewed, the margin of safety is narrower, the potential capacity of a collateral circulation is less and gangrene is more likely to develop.

It seems quite probable that the site of the thrombus may determine or modify the clinical course of thrombo-angiitis obliterans. A thrombus originating in the femoral artery and descending is less apt to cause gangrene than a thrombus occurring in the anterior or posterior tibial arteries, and ascending to the popliteal artery.

The possibility of an extensive collateral circulation developing in such cases is indicated by the injection of amputated legs and also by the post mortem findings in cases occasionally observed in which extensive thrombosis has occurred without marked circulatory disturbances.

I will cite the following exceedingly interesting case, as it indicates how extensive such a collateral circulation may be:



FIG. 8.—Injected specimen of foot shown in preceding figure, which demonstrates that the collateral vessels which are formed develop well up to the area of gangrene.

W. W., male, aged 47, of German extraction, was admitted to Johns Hopkins Hospital, December 12, 1926. About seven years before while working at Quantico, Va., the patient noticed pains in the calves of both legs. These became worse and recurred more frequently until the summer of 1921. The pain became so severe that he was unable to walk over half a block, without the pain becoming so severe in both calves that he had to stop. About this time he noted that both legs would swell during the day. The swelling disappeared at night. One and one-half years later similar pain and weakness developed in the right forearm when he worked. The pain would become so severe that he could not use his arm. In July, 1924, an operation was performed for varicose veins of the lower extremities. Multiple incisions were made on both sides and sections of the veins removed. The intermittent limping still persisted.

Physical examination revealed a well developed and well nourished white man. The heart sounds were faint, a slight blowing systolic murmur being heard at the apex. The radial pulse was not palpable on the right side. The left radial pulse could hardly be felt; but the arteries were not like pipe stems. Scars of previous operations could be seen upon the legs. Both feet were flushed. Pulses in the dorsalis pedis and posterior tibial arteries could not be felt, but the arteries did not seem to be sclerotic. When the legs were permitted to hang over the side of the bed, the feet became bluish red and engorged. This discolora-

tion persisted for several minutes when the lower extremities were placed on the level. The feet felt cold. The hands were red, but blanched quickly when pressure was applied. Palpation of the brachial arteries failed to reveal any pulse on the right side; there was but a slight pulse on the left side. The carotid pulses were obtained with difficulty. Palpation of the femoral pulse was difficult because of the overlying fat.

Blood pressure readings could not be obtained in the right arm. On the left side the pressure was systolic 136, diastolic 90. It was suggested that the left femoral artery be tied. This was done. During the night the patient became hemiplegic and died.



FIG. 9.—Histologic specimen of the aorta in case cited in the text showing multiple thromboses occurring apparently in a diffuse thrombo-angiitis obliterans. The clinical history of the case would indicate that a very extensive collateral circulation must have developed.

The following is quoted from the autopsy record. The most interesting condition in the autopsy, and that which appears to be of the greatest significance is found in connection with the general arterial tree:—

"At the level of the celiac axis the aorta suddenly becomes reduced in diameter so that it measures hardly more than 1 cm. There is an old organized thrombus which totally occludes the abdominal aorta beginning at the level of the celiac axis and extending all the way to the bifurcation. For about 5 to 8 cm. below the celiac axis there is a small aortic channel of crescent shape which represents the only channel which passes through this portion of the aorta. When a probe is passed through this from above downward this channel is found to end about 5 cm. above the bifurcation, where it communicates directly with a comparatively large branch which leaves the aorta and spreads out into the surrounding tissue. Below this branch there is no lumen within the aorta. It is totally blocked by

an old organized thrombus which presents on section a peculiar transparent appearance. A complete blockage of the celiac axis has resulted from a comparatively fresh thrombus which extends from the celiac axis into the lumen of the aorta or perhaps in the opposite direction. The portion of the thrombus which is in the lumen of the aorta communicates with the fresh thrombus which lies between the exit of the celiac axis and the organized thrombus which fills the abdominal portion of the aorta. The beginnings of the common iliac arteries are occluded by old organized thrombi through which pass many channels. The thrombosis affected the internal and external iliacs on both sides. The left external iliac just before it becomes the femoral is only partially occluded by a thrombus. This is also true of the right external iliac. In the femoral artery on the left side there are extensive thrombotic changes. None of the branches of the femoral group appear normal.

In the right femoral region there are extensive thromboses of the femoral artery and its branches. All the main branches of the arch of the aorta show sclerotic changes. Total occlusion of the second portion of the right subclavian existed; this extends into the axillary and brachials. The right external carotid was closed by a thrombus. The point of origin from the common carotid is represented by a puckered scar. About 2.5 cm. above the bifurcation of the right common carotid the internal carotid artery is found plugged by an organized thrombus through which pass small, newly developed channels. Proceeding upward into the skull a similar thrombotic process is found in the internal carotid at the point of anastomosis with the vessels from the opposite side."

This extensive process, going on apparently for years, must have been accompanied by an extensive collateral circulation; otherwise gangrene or death of tissues would have resulted.

I have quoted from this record merely to indicate how extensive thrombosis may be and function be still maintained by a collateral circulation.

There is definite evidence in cases of thrombo-angiitis that gangrene in many cases is due to the extension of the process of the popliteal artery. Recent thrombi are not infrequently found in this vessel when an amputation is performed.

The indication in the treatment would seem to be to force the collateral circulation ahead of the advancing thrombus. Ligation of the femoral artery has been performed in seven cases, four have been distinctly improved. In two cases ligation was performed after gangrene had developed; subsequently amputation had to be performed. In one case death followed the operation. In this case death occurred from hemiplegia thirty-six hours after the operation. In another case an infection was present and ligation was not attempted.

Control of Pain.—Pain in thrombo-angiitis

undoubtedly is due to a number of different factors. It may be a true arterial pain. In four cases the pain has been controlled. The operation puts at rest an inflamed artery. Its final result will depend upon whether or not the collaterals which develop are diseased. An attempt is now being made to determine this.

That a collateral circulation does develop is also indicated by the frequency with which amputations through the middle of the leg are successful in thrombo-angiitis obliterans. The high percentage of failure in this type of amputation in arteriosclerotic gangrene indicates a difference.

In the treatment of the so-called diabetic gangrene there must be the closest co-operation between the surgeon and the internist. Insulin has changed the outlook and has practically done away with that most distressing accompaniment of surgery, diabetic coma. Inflammatory processes increase the normal blood sugar. They produce the same effect, but to a greater extent in the diabetic. It is particularly in the case in which an infection has developed that the co-operation should be the closest, for often it has to be decided whether an operation should be performed in the presence of a marked hyperglycemia, because it is impossible to control it in the presence of infection, or whether it is best first to institute antidiabetic treatment with the hope of improving the patient's condition. Insulin has robbed diabetes of its distressing surgical complications. It cannot be expected to aid much in limiting the gangrene, for this is caused by the same mechanism as gangrene in the senile arteriosclerotic, the occlusion taking place at much the same level.

Either a transecdyloid or a Gritti-Stokes is the best amputation.

In thrombo-angiitis we are dealing with another process in which the development of a collateral circulation is a striking feature. We can attempt to keep the collateral circulation ahead of the advancing thrombus by ligating the femoral artery below the profunda, or if amputation is necessary the collateral circulation may be sufficient to permit of an amputation through the leg. The development and behaviour of the collateral circulation determine the line of procedure.

An Address
ON
RHEUMATIC FEVER*

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JOHN GREEN was a boy 13 years old who was born in Glasgow, and came to Canada at the age of five. He had rheumatic fever when 8 years old, lasting some weeks; at 12 his tonsils were removed, not because he had a recurrence of sore throat but because the school doctor advised it. He had no other diseases. He could play with other children and did well in school. Lately, his colour was not very good and his father thought he was getting thinner. On December 3rd, he felt chilly in school and shivered all day. That night he had pain in his ankles, the next day in his knee and in both hips. Then he got a bad pain in his left side, then in his left shoulder, and over his heart, and here it was very severe. He stayed at home a week in bed and then was brought to the hospital. When I saw him he was propped up in bed, and his wan little white face looked old and worried. He breathed painfully and with a short grunt. His nails and lips were blue, and his fingers slightly clubbed. The pulse was 120 and the temperature 103° F.

To make a long story shorter he had a large heart with signs of mitral and aortic endocarditis and a pericardial effusion as well as dullness at his left lung base. In addition he had a fleeting arthritis. He vomited often and was in constant distress in breathing.

He improved for a time and the temperature came down slightly, but went up again; it did this three times during the six weeks he was in hospital. His leucocytes ranged from 23,000 on admission to 10,000 on discharge. The red cells were 3,000,000 and the haemoglobin 65 per cent. He went home in the ambulance with a temperature of 100° F. and pulse of 116 to

remain in bed for three months more, and is now free from fever, but with a sadly damaged heart.

A young woman aged 20, a nurse in training, had all the diseases of childhood including scarlet fever, and was subject to colds and sore throat until she underwent tonsillectomy at 15. At the age of 10 she had severe growing pains in the feet and ankles and calves, most severe at night. She was always active and took part in all sports and had no shortness of breath.

In January, 1927, she began to have pain in her feet and ankles with some swelling, and she reported to the orthopaedic department and was transferred to the medical ward on February 28th. Examination showed a displaced and forcible apex impulse, and an apical systolic murmur with a much accentuated pulmonary second sound. After a few days the pain in the ankles disappeared, but frequent leucocyte counts were all in the neighbourhood of 10,000 and 11,000 and an electrocardiogram showed a P.R. interval of .22 second returning later to .20 second. In spite of the normal temperature and pulse, she was regarded as a case of acute rheumatism and put on prolonged bed rest.

Peter L. *aet* 5½ years was a healthy baby until one year old. Since then he has had croupy coughs the greater part of every winter, but there was no history of tonsillitis. He never was really robust, and is undersize and underweight. A few weeks ago, he had a pain in the stomach with vomiting, and on being examined a mitral leak was found. The child has been snuffling without apparent reason for the last three weeks and the mother says that he complains that his underwear is too tight and he is constantly hitching his hips on this account, though she has specially made his clothing of

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ample size. When examining him he would frequently stick his tongue half way out. Advice was desired as to the removal of tonsils and adenoids but the condition was regarded as choreic and operation was postponed.

These three cases have been taken as illustrations, not because either singly, or as a group, they show all the features of rheumatic fever, but because they appeared in succession within a short time of each other, and a short time ago, and they may keep us from wandering too far afield in a region which is clinically boundless. If a text were needed for a talk upon the clinical aspects of rheumatic fever, it would properly be taken from the book of Jeremiah, the weeping prophet, and no words would suit it better than these, "Peace, Peace, when there is no Peace." The prophet of evil was never any more popular than a death's head at a feast, and he, with the candid friend, and the truthful critic, will get scant encouragement to proceed, but anyone who chooses rheumatic fever for a subject cannot go far without being forced to adopt the rôle of one or the other, or all three.

Rheumatic fever has, as a disease, a more unpleasant past, a more troubled present and a more gloomy future, than any other malady of which we know anything; and although it appears but seldom on certificates of death under its own name, it peoples the grave yards of the country in an appalling fashion under a legion of other names. It took generations for the doctrine of the unity of tuberculosis to be established in medicine, but now all of us think in terms of the tubercle bacillus when lupus, hip joint disease, pleurisy with effusion, meningitis or phthisis is mentioned. We do not look upon any of them as sequels of tuberculosis. We think of them as tuberculosis. And so when we think of mitral stenosis, of chorea, of adherent pericardium, of auricular fibrillation, of subcutaneous nodules, of forms of continued fever, or of migratory arthritis, we should look upon them not as results of rheumatism but as rheumatism itself.

By such an attitude we cease to look upon the disease as a short-lived nuisance, which in some instances in the distant future may cause trouble in the valves of the heart, and regard it instead as an invader which once established digs itself in, working under ground month

after month, with perhaps an occasional ruffling of the surface, bringing about eventually a damaged heart muscle, a narrowed valve, damaged arteries and damaged kidneys, which all the king's horses and all the king's men cannot set to rights any more.

In the inexorable march toward physical breakdown which the rheumatic infection sets going, one cannot help being reminded that

"The moving finger writes, and having writ moves on,
Nor all your piety nor wit can call it back
Nor cancel half a line,
Nor all your tears wipe out one word of it."

What is the agent responsible? That it is an infection no one can doubt. That it is a special organism of the streptococcus group, the *Diplococcus rheumaticus*, Poynton and Paine believed twenty-five years ago and some still hold, but few have been able to confirm. As late as January, 1927, Small of Philadelphia published a study of an organism which he believes satisfies the requirements for an etiological factor, but it will require more detailed study. This is a streptococcus named by him the *S. cardioarthritidis*, obtained from the blood of an adult patient with rheumatic fever, which he was able to grow on media, and on injection into rabbits to produce an arthritis, and in one instance choreiform movements. At autopsy there were focal necroses and inflammatory foci in the heart muscle resembling, but not identical with, Aschoff's bodies. He prepared a horse serum and treated a number of cases of rheumatic fever with varying success.

But whether either or neither of these organisms is eventually established in the seat of dishonour, the histological basis of the disease is now firmly fixed. The essential histological unit or submiliary nodule is found in the heart muscle, on the pericardium, in the synovial membrane of a joint, and in the subcutaneous nodule. It is of vascular origin and shows an active proliferation of the endothelial and fibrous tissue cells of the neighbourhood. Polynuclear leucocytosis is not a feature; any leucocytic reaction is of lymphocytic character. The lesion is essentially a productive one.

Taking this unit as our starting point, in the same way as we have the miliary tubercle in tuberculosis, how can we explain the course of the disease? Carey Coombs insists that rheumatic fever should be regarded as a disease

of childhood, and states that three quarters of the cases do so begin; again the parallelism with tuberculosis and syphilis may be invoked. Infections of tuberculosis in early life, and syphilitic disease in its earlier and secondary stages tend to be generalized and severe. In later life, there tends to be a more local, but more locally severe reaction, for example ulcerative or caseating pulmonary tuberculosis, or local tertiary syphilitic manifestations. This type of reaction, Von Pirquet refers to as allergy or altered reaction, and is an effort by the body already sensitized, to react violently, locally, for the purpose of restricting the infection to a smaller area. This same form of reaction Homer Swift says is seen in rheumatic fever.

In children the widespread nature of the disease is seen in chorea, in nodules and in carditis, either together or successively. In adults the more violent local reactions are seen; in the joints as acute and painful arthritis, and as sclerosing processes in the mitral and aortic valves.

A very interesting observation by Swift is that in acute rheumatic arthritis, bits of joint tissue when excised showed the typical vascular and perivascular lesions found in subcutaneous nodules. When the patient had received no salicylates there was marked œdema; when salicylates had been given the exudation was less marked, but the proliferative lesions were still to be found.

There are then two types of response to the rheumatic poison. One proliferative, represented by the submiliary nodules, which is uninfluenced by salicylates; the other exudative, to which the signs of joint inflammation are due, and which subside under salicylates. This offers a reason why after apparent cure of the symptoms of acute rheumatism, the slow but certain process of cardiac damage goes on. This chronic proliferative type of reaction may explain many cases of rheumatic endocarditis without a history of rheumatism; on the other hand, what may be regarded as recurrent attacks of rheumatism may be but the appearance of exudative features in a person for a long time the subject of rheumatic infection in its proliferative form.

One may then speak of rheumatic fever as a general disease with submiliary nodules of

a proliferative nature in various organs; and the common feature of rheumatism as we know it clinically, the valvular endocarditis, has this same origin. Coombs and Swift have shown, and Swift has demonstrated in four cases dying early in the course of rheumatic arthritis that the heart valves show proliferative change and submiliary nodules in their interstitial tissue before any verrucae are deposited upon the surface, and that these verrucae or warty vegetations arise from thrombi deposited upon the endothelium at the site of the interstitial inflammation. Submiliary nodules in the substance of the myocardium, proliferative in character, with a tendency to necrosis at the centre, described in 1904 by Aschoff, and known by his name, are the essential and the typical lesions of rheumatism in the heart muscle, and from these there develop areas of fibrosis, which lead to the breakdown of the myocardium.

Letulle, Bezancon and Weil make the observation that from the histological character of these lesions one is justified in comparing the action of the rheumatic virus yet unknown, with that of tuberculosis and syphilis.

In the absence of definite knowledge of the cause of rheumatism, the inquiry has been pursued along many lines, and the social aspects of the disease have come in for much study. G. F. Still states that in the Children's Out-patient Department of King's College Hospital, among 229 medical cases, between six and ten years old, 13.1 per cent showed evidence of acute rheumatism in some form, whereas in 700 consecutive cases of the same age among private patients, chiefly well to do, only .7 per cent showed evidence of rheumatism.

Two investigations in recent years have shed much light upon rheumatism as a social disease, one a report of the Medical Research Council of Great Britain, the other the report of the Subcommittee of the British Medical Association on Rheumatic Heart Disease in Children. From both of these I shall quote freely.

The first inquiry took as a basis the histories of a group of patients suffering from rheumatism or rheumatic carditis drawn from Great Ormond Street Hospital, London; St. Thomas' Hospital, London; and the Royal Hospital for Sick Children, Glasgow; and a control group of histories

of 100 non-rheumatic children of the same hospital class. It was found that among the living brothers and sisters of the rheumatic cases 8 per cent had rheumatism, while among the non-rheumatic only 2 per cent of the brothers and sisters were affected, and the parents of the rheumatic children had rheumatism much more frequently than those of the non-rheumatic. These figures would point to the probable infectious character of rheumatism, and all of us have seen instances in which the disease has occurred too frequently in one neighbourhood to be regarded as a coincidence. Within the past few months three members of one class in a training school for nurses came down with acute rheumatism within one week of each other.

The association of rheumatism with sore throat has always been a live question, and in the Medical Research Council's group the proportion of healthy throats was significantly greater in the non-rheumatic patients than in the rheumatic ones, but the number of healthy throats was not greater in the members of non-rheumatic families than in the non-rheumatic children of rheumatic families.

One very interesting series of statistics refers to 129 cases who had tonsil operations, and subsequently developed rheumatism. These operations were all done on members of rheumatic families. Of these 129, 60 who had clear records of satisfactory enucleation developed rheumatism up to 9 years after operation.

Reginald Miller in the British Medical Association Committee's report followed the histories of rheumatism developing in 45 cases previously subjected to tonsillectomy. He found sore throat, arthritis and carditis to be greatly diminished in the cases of rheumatism developing in patients whose tonsils had been previously removed. Muscular pains continued to be frequent and chorea seemed to be totally uncontrolled by previous tonsillectomy. The fact that 45 cases in one group and 60 in another developed rheumatism after tonsillectomy shows that the removal of diseased tonsils is only one factor in dealing with those predisposed toward the disease.

An interesting feature of the disease which has been commented on from time to time is the social distribution of the cases. The figures given by Still showing the great predominance of hospital cases over private cases, are con-

firmed by many other observers. In the Research Council report, the families studied were grouped into Classes A, B, and C; the A families having sufficient incomes and a margin over; the B group being just able to make ends meet and with no margin over; the C group being distinctly under the poverty line.

The cases of rheumatism were disposed in the proportion of 13 per cent to A, 65 per cent to B, and 22 per cent to C. So that if wealth is a bar to rheumatism, extreme poverty alone does not apparently induce the disease.

Such features as the vocation of parents, alcoholism in the parents, comfort of dwellings, congestion of sleeping quarters, quality of clothing, body cleanliness and freedom from vermin and distance from school were all studied and found to have little or no bearing upon the incidence of the disease, whereas better maternal care, greater freedom from dampness and higher elevation of houses were all noted among the control cases.

A most interesting sidelight on the problem appears in the comparison of the general incidence of rheumatism in the children of London Board schools with that in four "poor law schools" to which children are sent on account of destitution, illegitimacy, death of parents, etc. These resident schools contain from 250 to 550 children each, and are well lighted and have ample space in the suburbs of London, and the children are well fed; and it was found that only 1 per cent of the inmates suffered from rheumatism as compared with 3.6 per cent met with in children in the Board schools who lived at their own homes.

Rheumatism is a disease of the towns rather than of the country. In the English recruiting figures there were 32 cases per thousand of valvular disease of the heart in youths from the East Riding of Yorkshire, to one per 1,000 from the Channel Islands; and in Wales, rural Carmarthen showed two per 1,000 and industrial Cardiff 22 per 1,000.

It is also a disease of childhood, 1 per cent of children entering school at Bath, and 2.36 per cent leaving had organic heart disease. Though the late winter and early spring bring the most cases of rheumatic fever into hospitals there is rarely a time of the year that a case is not to found in a medical ward, and a detailed description of the clinical features seems unneces-

sary. We may however, spend a few moments on a definition of what the disease is and what it isn't.

It is a general infection in which the heart is practically always affected and frequently permanently damaged, and in which the nervous system is often involved. It has frequent periods of febrile reaction, commonly associated with a multiple non-suppurative and non-deforming arthritis. Neither this, or any other definition will cover all we mean, or leave out what we do not wish to include.

The features of rheumatism are simulated, and even its name applied to a multitude of affections of the joints, and here we may define the differences as we see them clinically. An arthritis may be due to a recognizable and nameable disease as rheumatic fever, scarlet fever, cerebrospinal meningitis, pneumonia, typhoid, dysentery, tuberculosis, syphilis or gonorrhoea, but only one of these is rheumatism. So-called infectious arthritis includes another group due to infection from the tonsils, teeth, sinuses, prostate, female genital tract, lungs and bronchi, gall bladder or bowel, and these are not rheumatism. Again, there are the types spoken of as primary progressive polyarthritis and primary osteoarthritis, and finally gout and these are not rheumatism.

The diagnosis of rheumatic fever from the other forms of arthritis is sometimes simplicity itself, and sometimes extremely difficult. No single absolutely diagnostic feature exists, but a multiple and migratory arthritis which is both painful and tender, usually preceded by a tonsillitis and accompanied by cardiac involvement and leucocytosis, which yields to salicylates, and which leaves no deformity, is characteristic of rheumatism.

On the other hand, an arthritis, multiple at first and later localizing in one joint, with limitation of movement from any other cause than pain is not likely to be rheumatism.

The onset of arthritis in young boys with very acute pain and tenderness about one joint is more significant of acute epiphysitis. The more lingering types of arthritis, without heart involvement always raise the question of some non-rheumatic state, and I confess that in some instances a positive diagnosis seems impossible except through time. The cycle of anaemia, chorea, tonsillitis, arthritis and rheumatic

nodules in which more often than not the arthritis follows rather than precedes the other features, illustrates the aspect of a general infection, which I think is the important feature we should bear in mind. Symptoms which have been often described as predisposing causes to rheumatism are almost always symptoms of the presence of the disease. A child who is pale, irritable, fidgety, inclined to sore throats and unexplained fever, and in whom tuberculosis can be excluded, should be regarded as a potential subject of rheumatic infection and safeguarded accordingly.

The matter of fever may introduce a doubt into the diagnosis of rheumatic carditis, for naturally the association of endocarditis with fever, raises the question of subacute bacterial endocarditis. It is not perhaps generally recognized that the endocarditis of rheumatism may be the source of continued fever, but such is the case. The question of course is readily cleared up by finding of the *Streptococcus viridans* in the blood culture, which establishes the presence of the subacute form. A negative blood culture, however, simply means "not proven," but a careful estimate of the clinical features usually gives the answer. The presence of embolic signs strongly suggests the graver disease, and these may be found in petechial spots on the limbs or body, in the tender points in the ends of the fingers and toes, in flame shaped patches in the retina, in sudden splenic pain and tenderness, in the presence of red blood cells in the urine, and in cerebral embolism. The fever of subacute endocarditis is likely to be of higher range and more irregular type. Clubbing of the fingers, and enlargement of the spleen suggest the subacute form, as also does the more rapid change in the cardiac sounds under observation, but the development of auricular fibrillation is on the other hand characteristic of the rheumatic infection.

Cheadle whose delightful monograph on "The Rheumatic State in Childhood" was published in 1889, first emphasized the fact that many children had rheumatism and rheumatic heart disease long before they had arthritis.

The presence of subcutaneous nodules, which aside from mitral stenosis is the one incontrovertible sign of rheumatism in the living, would seem to be less common in this country

than in England, but they are usually found most often where the search is most careful. Barlow and Warner in 1881 pointed out their importance in rheumatism. They are subcutaneous, attached to fascia or tendons, and are to be felt rather than seen, varying in size from a hemp seed to an almond. They are usually painless, and are found over the malleoli, the elbows, the extensor and flexor surfaces of the hands and the extensors of the feet, the vertebral spine, the scapula and the occiput.

They may come in crops and may last from days to months. Cheadle points out that the prognosis is graver the greater their number.

Chorea, a phase of the rheumatic cycle, has of late come to be regarded as a true encephalitis of rheumatic origin, and I shall not do more than lay stress upon its inclusion in the unity of rheumatism, except to point out a pitfall in the diagnosis from so-called habit spasm. A tic or habit spasm is more localized and more stereotyped, but having said that, it would take a Sydenham or an Osler to say in some instances what was chorea and what was not. In the matter of skin rashes, many such have been regarded as rheumatic and it is traditional to speak of rheumatic purpura and rheumatic erythema. In the realm of speculation all men are free and equal, but speaking for myself, I know of no rash which can with proof be called rheumatic.

The treatment of rheumatic fever must of necessity be considered in sections, for though the disease is one, its treatment in the form of mitral stenosis and heart failure, offers a problem as different from the treatment of rheumatic arthritis, as is the treatment of Pott's disease from that of acute pleurisy.

For that reason we shall confine ourselves to the management of the earlier and progressive phases of rheumatic infection.

In the acute arthritis we have two aspects—as acute tuberculous pleurisy has two aspects. First: an acute and painful illness to be symptomatically treated; and second: a warning of the presence of systemic disease, the care of which will run into months or years.

The first group of symptoms results from the exudative reaction in the joints, and demands bed rest—absolute bed rest. The profuse sweating requires spongings and a bed garment of the nature of flannel or flannelette. Much

can be done for the patient's comfort by immobilizing the joints. Cotton batting or pillow splints are useful about the knees and ankles. Hot lead and opium fomentations or ice bags bring comfort. The application of oil of Gaultheria acts as a counter irritant, and may be of service though practically no salicylate effect can be expected from its absorption. We are fortunate in having a drug or drugs salicyl and cinchophen compounds which in 80 per cent of cases, if properly employed rapidly give relief to the pain and the fever. The proper employment implies the giving of the drug to the point of its toxic effect or the obtaining of improvement. Fifteen grains (1 gm.) every hour will answer on the average, and as a rule, six to ten such doses produce the symptoms of nausea or tinnitus. The drug is then to be discontinued for 12 hours, and two-thirds of the dose given the next day and repeated as required.

Given thus we have seen the almost miraculous results in the relief of pain. Delirium and renal poisoning may occur.

Acetylsalicylic acid (aspirin) may be given in two-thirds the dose of sodium salicylate, or neocinchophen (tolysin) in an equal dose to the salicylate. Tolsin is insoluble in water, and is less readily absorbed, and thus probably causes fewer toxic effects. Undoubtedly, however, there are individual peculiarities and one drug may give relief when the other fails. In regard to toxicity, the fatal dose of the sodium salicylate is from 1 gm. to 1.5 gm. per kilo of body weight and of acetyl salicylic acid about half that amount. Neocinchophen seems not to be fatal in any dosage. The average toxic dose of sodium salicylate was found by Hanzlyk to be for males 180 grains (12 gm.) and for females 140 grains (9 gm.); of acetyl salicylic acid 100 gr. and 85 gr. and of neo-cinchophen 225 gr. or 15 gm.

As to the specific action of the salicyl group toward rheumatism, Hanzlyk is of opinion that this has not been proven, as similar relief has been given by combinations of opium and non-salicyl analgesics, though he admits that in two parallel groups of cases, those treated by salicyl received a better measure of relief.

His impression is that the salicylates are efficient symptomatic remedies, which may be administered in large doses combining anti-

pyretic and analgesic effects, and their efficiency outweighs any danger to kidney function which their use may entail, but in no way must they be regarded as specifics against rheumatic infection, one illustration of this being that with the symptomatic improvement, subcutaneous nodules may continue to appear, the heart show progressive involvement and the leucocyte count may continue high. In spite of this, the lowered fever and pulse rate, the relief of pain and the sense of well being engendered, save labour to the heart and shorten the period of convalescence.

One hazard in salicylate medication which must be considered is the artificial sense of improvement under the drug, as a result of which patients have been allowed up, and on withdrawal of the salicyl have had relapses, or have developed symptoms of cardiac damage.

The most difficult period in the treatment is when symptomatic improvement has occurred and more liberty is demanded. It takes considerable backbone in the physician to refuse such liberty, but in view of what we know of the pathology of the disease one must be adamant on this point. May we remind ourselves again that the acute arthritis is only an incident in the disease, and that in addition to the exudative features shown by the arthritis, the proliferative process still continues, and that involvement of the myocardium in this process is not the exception, but the rule. As an example of this one may quote the work of Cohn and Swift in which of 37 cases of acute rheumatism having daily electrocardiographic tracings, 35 showed signs of myocardial damage, either as a prolonged P. R. interval, alteration in the ventricular complex, or the occurrence of numerous irregularities in the rhythm.

Facing this fact, we are as blamable if we allow a patient up and about as soon as his fever subsides, as we would be, should we permit a patient with an acute pleurisy to return to work without treating him as a case of incipient tuberculosis, or as we would be if we permitted a syphilitic to go untreated once his primary sore had healed. It is regrettable that even with a prolonged period of rest we cannot guarantee future cardiac soundness to the rheumatic patient, but to give him ample rest is the one best thing that we can do. Rest for how long?

Five signs there are which help us to say how

long; normal temperature, normal pulse rate, absolute cardiac regularity, gain in weight and colour, a normal leucocyte count. These are the outward and visible signs of subsidence of the infection, and as a rule this takes at least 100 days, and after that there should be a period of convalescence without work. Even then we may remember, that after 100 days Napoleon returned from Elba and set Europe by the ears, and the 100 days may sometimes need to be lengthened to 100 weeks. In the meantime what may be done? There are the tonsils.

I hesitate to say it, but in this disease when life hangs on what we do—the attitude toward the tonsils is that they should be considered guilty until they are proved innocent—and who is sufficient for this thing? If we recall that in the figures given above there were many relapses, and even new attacks of rheumatism after tonsillectomy, but the type of attack was milder and the cardiac damage less pronounced, it is hard to see how we can take the responsibility of leaving tonsils which are even suspicious. All other septic foci should be treated, but the tonsil is the most important.

In the matter of feeding I think the uric acid bugaboo has died a natural death. Rheumatic fever has no more connection with uric acid than it has with the war in China, and what a convalescent from acute infection requires is good food, and lots of it, and this is true of rheumatism. Another matter of therapy concerns sunshine; and direct sunlight and the quartz lamp—either or both of these—have great value, as the aid which they give in combating chronic infections makes them especially useful in this long struggle. Iron and cod liver oil as the patient can take them are of definite benefit. Therapeutically, however, we are still in the same position toward this disease as we are toward chronic nephritis, and as we were toward diabetes before insulin. Until we know the etiology we “manage” our cases, we do not “treat” them, and since “management” has done so much for tuberculosis we can hope for much in rheumatism.

It is taken as a matter of course that six months is practically a minimum in the treatment of tuberculosis, and we should not grudge the same period of time in treating this disease which is a greater vital and economic menace.

You may recall a paper by Sir Wm. Osler in 1919 on the prevention of venereal disease, in which he analyzed the mortality returns of England and Wales for 1915, and found that 1,886 deaths were debited to syphilis out of a total of 562,000. He dissected the returns, and taking such causes of death as meningitis, general paresis, tabes, cerebral hæmorrhage and thrombosis, insanity, aneurism, organic heart disease and still births, and considering the percentage of each, which were syphilitic, he found that syphilis rose from the tenth to the

first place among "the ten best killers" and assumed the place of "Captain of the men of death."

Similarly if rheumatism were to be blamed for its proportion of the cardiac, arterial and renal deaths, its place in the rogues' gallery would be very near the top, and we who daily see its ravages in those who largely people the medical wards of all hospitals cannot look at the mildest form of its appearance and say *Peace, Peace, when there is no Peace.*

An Address ON ANGINA PECTORIS*

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SINCE Heberden in 1768 first drew attention to the classical symptoms of angina pectoris, a mass of observations has been accumulated. Many interpretations of the symptoms have been offered, and yet even to-day the subject still remains to be accurately and satisfactorily clarified. Among these observations may be mentioned those of Morgagni and Rougnon of the French school, who gave clinical and autopsy findings of their cases; Hunter, who described his own personal condition, Jenner and Parry, with their theory of the coronary pathology of the disease; and Erichsen, who attributed the symptoms to coronary occlusion. Between 1867 and 1871 Sir Lauder Brunton described extrapectoral forms of the disease and introduced the use of the nitrites to relieve spasm. Later, Sir Clifford Allbutt and Corrigan advocated the theory of reflex impulses arising in the aorta as a result of aortitis, with consequent stretching of the nerve-end plates. Then followed Osler who, in 1896, in a series of addresses in Baltimore sponsored the myocardial coronary theory; MacKenzie, who attributed the

symptomatology to coronary disease and myocardial fatigue; Wenckebach, who corroborated Allbutt's theory, and finally Jonnesco, of Bucharest, who first severed the cardiac nerve supply for relief.

As an introductory thought may I emphasize the fact that angina pectoris is but a symptom-complex and not a distinct pathological entity or disease. The very marked divergence of opinion as to the exact etiological factors concerned in the production of angina pectoris has been due to our lack of knowledge regarding, first, how the pain is initiated, and along what paths or tracts of the peripheral and central nervous systems it is transmitted, and second, what tissues are involved, and by what type of stimulus they are excited to give rise to this group of symptoms. From an experimental point of view we are at a great disadvantage in not being able to appreciate in animals the subjective symptoms arising from the pathological conditions we produce. This is the difficulty in all animal experiments referable to angina pectoris.

Two separate and distinct types of angina pectoris are universally recognized to-day,

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namely, (1) primary angina, (2) secondary angina.

Under the classification of the primary type we usually find cases in which definite pathological states are recognized in the heart and its blood-vessels, and in which the heart is the prime factor in the production of the typical symptomatology. Under the heading of secondary angina we find a wide category of etiological factors, which supposedly give rise to the peculiar sensations common to this state. In this secondary type, we recognize that the underlying cause is a hypersensitive state of the central nervous system, and that the general health of the individual is below par. Secondary angina is most frequently encountered in women in whom an over-wrought nervous state is present, particularly, if in addition they suffer from an unrecognized focus of infection or physiological derangement. Possibly,

the best example of a typical case of this secondary type of angina is seen in the young untrained individual competing for the first time in a 220-yard race. After 100 yards or less he not infrequently is compelled through præcordial distress to desist, and suffers perchance a radiation of the pain down the inner side of his left arm. What has happened in the case of this individual is that his heart, untrained to undertake greatly increased activity, cannot under the circumstances accommodate itself rapidly enough to the increased effort. We have thus to deal with a normal heart labouring under an improperly adjusted blood-supply.

Reviewing the occurrence of *pain in muscular organs* in general, one recognizes certain well defined factors, disturbance in any of which renders the individual liable to pain. Among these may be noted the anatomical condition of

CHART I.—HISTORICAL ACCOUNT OF ANGINA PECTORIS

Date	Author	Comments
1768	Heberden	Described a disorder of the breast with a short clinical account of the symptoms.
1768	Morgagni } Rougnon }	First of the French school to give a clinical account with autopsy findings of their cases
1773	Hunter	Described the classical symptoms of his own attacks
1776	Jenner and } Parry }	Wrote of Hunter's attacks and attributed them to disease of the coronary arteries.
1842	Erichsen	Attributed attacks to closure of coronary arteries.
1871	Brunton	Described extrapectoral forms and first instituted the use of the nitrites
1884	Allbutt and } Corrigan }	Ascribed symptoms to increased arterial pressure stretching the nerve end plates in the aorta; e.g., in aortitis and aortic degeneration.
1893	Huchard } Rosenbach }	Clinical accounts.
1896	Osler	Supported rather the myocardial-coronary theory.
1895 } 1913 }	MacKenzie	Coronary disease with myocardial fatigue.
1915	Wenckebach	Corroborated Allbutt's views.
1916	Jonnesco (Bucharest)	First to operate on human beings (section of sympathetic nerve supply to heart).

CHART II.—TYPES OF ANGINA PECTORIS

Type	Age	Sex	Pathology	Prognosis
I. Primary	Over 45 years	Males	A failing heart. Myocardial degeneration Coronary sclerosis and narrowing Aortitis. Arterio-sclerosis of aorta. Hypertension. Hypersensitive C. N. S. (occasional) Sense of well-being between attacks.	Poor.
II. Secondary.	Under 45 years	Females; also ill developed and ill-nourished males.	A normal heart. Functionally poor myocardium. Frequently hypotension. Focal infections. Toxæmias. Hypersensitive C. N. S. Sense of ill-health between attacks.	Good, with improved health.

the muscle, the blood supply, the amount of work which the muscle is capable of performing and the state of its irritability. A muscle, enfeebled either through chronic degeneration or relatively acute toxæmia, if called upon to accomplish more work than it is capable of, manifests, of necessity, signs of distress, the most common of which is local or referred pain. A similar condition results in muscle which, though inherently capable of performing considerable work, has a blood supply insufficient to accomplish the minimum amount of work, even in a resting period. When the demand for work is *increased*, the blood supply, if insufficient, correspondingly influences the muscle and limits its capacity for effort. As a result the muscle shows signs of distress similar to those already described. In other cases the nervous system, both autonomic and cerebro-spinal, may be so irritable through the influence of factors such as toxæmia, that it is affected by stimuli from the heart, which otherwise would not produce painful sensations.

Again, the possible influence of disturbances of the vasomotor nervous mechanism cannot be disregarded as an etiological factor. At the present time, however, the evidence available is not sufficient to define exactly the method of operation of this influence.

With the secondary type it is not uncommon between attacks for the patient to complain of some ill health. These secondary types of angina, in contrast to those of the primary form always show improvement, with a disappearance of the pain and distress on exertion when the general health is improved. The primary form, on the other hand, rarely, if ever, shows improvement. The præcordial pain may disappear, but in its place some dyspnoea on exertion supervenes; the individual is checked not by the pain but by the breathlessness induced by effort. In this class the prime factors in the production of the symptoms lie in pathological states of the myocardium, and its blood-vessel supply, both conditions being irremediable.

The most commonly accepted theories at the present time as to the causation of angina pectoris are based upon the pathological findings of cases which have shown this definite symptom-complex. In summarizing these we can say that the most frequent post mortem findings are those of myocardial degeneration, of coronary sclerosis,

coronary narrowing and coronary infarctions, as well as aortitis, specific or arteriosclerotic in origin, and leading to a narrowing or occlusion of the coronary mouths in the sinuses of Valsalva. Often, however, no gross lesion is demonstrable.

THE MECHANISM OF THE PAINFUL SENSATIONS EXPERIENCED IN INDIVIDUALS SUFFERING FROM ANGINA PECTORIS

Ordinarily the normal physiological activity of the heart and great blood-vessels occurs without any consciousness whatsoever. Frequently, however, as in cases of paroxysmal tachycardia, the individual becomes aware of the extra-systoles and even of normal rapid beating and complains of a fluttering sensation or palpitation within the thorax. If these periods of increased activity of the heart's action become more marked, and particularly in the presence of manifest disease of the heart, we get a complaint of præcordial or substernal pain which may radiate into the neck, along the lower border of the left mandible, through to the back between the scapulae, down the inner side of the left arm and, not infrequently, down the right arm. These sensations of pain occur in individuals, the subject of anginal attacks, most commonly during periods of bodily or mental activity, and mental anguish, or when the patient is exposed to a cold atmosphere; and may often be associated with a feeling of impending dissolution. The pain arises from an abnormal stimulus in the heart or its coronary vessels, and travels along the sympathetic and depressor branch of the vagus nerve fibres to the sympathetic ganglia and thence to the spinal cord; from here it is transmitted to nerve cells which are connected with the pain system of the cerebro-spinal nerves. The sections of the cerebro-spinal tract receive these impulses from the depressor branch of the vagus and sympathetic supply of the heart and great vessels, and they give rise to a stimulus which in turn sets up an excitation resulting in the sensation of pain. The vagus conveys impulses from the heart which may affect the third branch of the fifth cranial nerve, giving rise to pain along the jaw and to the second and third cervical nerves, thus inducing pain at the back of the head and neck. The sympathetic nerve of the heart is in close relation to and may affect the eighth cervical and

first, second, third and fourth thoracic nerves, giving rise to pain in the chest and arm. This much we know regarding the paths taken by these impulses or stimuli from the heart, all of which has been frequently demonstrated. As to the etiological factors which originate these stimuli we are still at a loss to fathom their nature. Illustrating the type of pain following upon the stimulation of the sympathetic nerve to the heart and great vessels, let me cite a personal experience at a recent operation on a patient, the victim of quite severe attacks of angina pectoris and for whom the sympathetic nerve ganglia were being severed under local anæsthesia for the relief of his symptoms. The surgeon with skill and despatch exposed the entire sympathetic chain from the lower border of the left mandible to the entrance at the upper thorax and grasped the superior cervical sympathetic ganglion with a hæmostatic clamp to hold it while severing the nerve. Hardly had the clamp been secured when the patient instantly complained of excruciating pain beneath the midsternum, behind the left ear and down along the inner side of the left arm, voluntarily comparing the pain in all its details to that from which he had been suffering for the past few months. As soon as the nerve was severed, and that was almost immediately, all pain subsided and remained so for a month at least, or as long as I had opportunity of observing him.

STATEMENT OF THE THEORIES ADVANCED AS TO
THE CAUSE OF THESE SENSATIONS

Probably the most generally accepted theory as to the underlying mechanism of præcordial and referred pains in cases of angina pectoris is based upon a simple and well known physiological observation. This experience, quite familiar to all present, is briefly this,—that if the blood supply to a limb be partially obstructed by bandage or tourniquet, and muscular effort be made in the thus mechanically occluded member, fatigue symptoms will soon occur with a feeling of stiffness and muscular exhaustion. If the effort be continued, all grades of severe muscular cramp and pain will occur. This has been taken to represent what actually happens in the case of the heart muscle when attempting to work under the handicap of a poor coronary blood supply. The poor

nutrition, produced as a result of coronary narrowing and occlusion, and resulting in a diminution of the total capillary blood supply, is a common accompaniment of advancing years and of diseased and arterio-sclerotic vessels. (Gross). Diseased states of the first parts of the ascending aorta may also partially obstruct the coronary orifices arising from this part of the aorta.

Another factor beside the diseased coronary arteries exists in the form of a degenerated and diseased myocardium itself. A degenerated and atrophic myocardium is unable to undertake a greatly enhanced load and cannot give off into the blood stream the usual amount of waste products of muscle cell activity, which help in the regulation of the vascular supply to the various parts of the heart musculature. The dilatation of the capillary bed and coronary arteries is dependent, in part, upon the local liberation of CO_2 into the blood stream. It has been recently shown that owing to the increase of CO_2 which occurs when normal muscle cells are in activity, we get a maximum flow of blood through the coronary arteries and their capillaries. A diminution in the amount of this CO_2 in itself, without any coronary disease, may be quite sufficient to produce the anginal seizures during increased heart action, or when the heart is called upon to pump against an increased load.

It is my impression that when we fail to observe at autopsy any gross or microscopic changes to account for an individual's attack of angina pectoris, we are dealing with a very poorly functioning musculature of the heart. Unfortunately, we are unable as yet by histological technique to tell when a heart muscle cell is physiologically normal; but, we can detect some of the grosser evidences of degeneration. Attention has recently been drawn in the published accounts of certain cases of angina pectoris, which have arisen in the condition of myxœdema and exophthalmic goitre to a non-physiological heart muscle, as the most probable etiological factor, although histologically very little which is considered pathological is manifest. Fatty degeneration and infiltration may be seen in some of the cells which would point to a loss of glycogen upon which all muscle contraction is so dependent. Then again, we find in most of the cases of

exophthalmic goitre, as well as those of myxœdema, an enlargement of the heart, due to a soft, flabby myocardium, involving uniformly all chambers of the organ. It has been pointed out by Fishberg, in 1924, that not unusually one finds in anatomical, experimental and clinical observations a loss of thyroid secretion may involve among its other consequences some injury to the vascular system. Instances are reported in these cases where generalized arterial changes have been noted in the larger and smaller arteries of the body closely simulating arterio-sclerosis. If this be true, it is not difficult to see how the coronary arteries may likewise suffer the same changes and thereby give rise to anginal seizures. Interesting observations are reported where patients with myxœdema, undergoing treatment with thyroid gland, complain of anginal attacks and have even been known to die in these seizures. There seems no doubt that in cases such as this the basal metabolic rate has become elevated, and with it the heart muscle has been called into greater activity to furnish the body tissues with an increased oxygen supply; this in its turn has called for greater cardiac action in the presence of a poor coronary supply and a weakened myocardium.

Coronary thrombosis may occur following upon repeated attacks of angina pectoris, and may even be the initial cause of the anginal attacks and therefore must be differentiated. With coronary thrombosis the attacks are more severe and prolonged, and unaffected by nitrites and are relieved only after large doses of morphia; the pain is referred to the præcordium or upper abdomen and occurs more commonly when the individual is at rest and not as a rule during exertion. With the anginal pain of coronary thrombosis we see marked dyspnœa, a gradual fall of blood pressure, cyanosis, gastro-intestinal symptoms, and all evidences of myocardial insufficiency, whereas in angina pectoris the pain is less severe, is relieved by nitrites and is unassociated with a falling blood pressure but rather with a rise. The event is more commonly seen during exertion.

A typical and illustrative case is reported in the *Annals of Clinical Medicine*, July, 1926, v, 9, by Dr. F. L. Wilson. In this report the clinical history of a case of angina pectoris is given in which the coronary origin of the attacks

became evident and also the relief obtainable by severance of the sympathetic ganglia. The following is an abstract of the notes:

An automobile worker aged 58 years was admitted to hospital complaining of attacks of pain under the lower sternum and in the left arm, with shortness of breath and palpitation. The attacks followed exertion and were relieved by rest and amyl nitrite. On examination the cardiac impulse could not be distinctly felt; the left border of the heart was 1 cm. outside the nipple line; the heart sounds were distant; no murmurs were heard. The first sound at the apex was low pitched; there was no accentuation of the aortic second sound. The peripheral arteries were slightly tortuous and thickened. The pulse was regular; its rate 76. The lungs were everywhere resonant and no râles were heard. On the third night after admission a very severe prolonged and continuous attack occurred not relieved by amyl nitrite and accompanied by marked prostration, œdema of the lungs, distant heart sounds, and very weak pulse. There was also a rise in temperature, and a leucocytosis. The electrocardiogram indicated that a profound and sudden change had taken place in the heart and the subsequent occurrence of temporary complete heart block indicated the involvement of the larger branches of the bundle of His. Owing to the severity of the pain which appeared to be impossible of relief by other means, a cervical sympathectomy was done under ethylene anaesthesia, giving complete relief.

Death eventuated ultimately from thrombosis of the coronary arteries. The autopsy corroborated the clinical diagnosis. The striking electrocardiographic changes which took place during this patient's attacks of pain have not previously been recorded. The evidence thus afforded may aid in a more accurate diagnosis.

TREATMENT

The treatment of the primary type of angina concerns itself with the alleviation of the painful sensations. As an introductory thought, I should like to stress the fact that in a large number of suitable cases relief can be afforded. Where medication, etiological therapy, and symptomatic treatment fail, surgical intervention is worthy of serious consideration. All the more do I emphasize this, on account of the comparative simplicity of the procedure. Nitrites, nitroglycerine, morphia and often inhalation of chloroform may act as temporary procedures. Bromides in their sedative action relieve the hypersensitive nervous state and induce sleep and rest: the iodides appear to improve and arrest the development of fibrosis, particularly in cases showing hypertension. Diuretin over prolonged periods also seems to afford some relief. The patient must be enjoined to regulate his life in such a way that his reserve is not encroached upon: strenuous

mental and bodily activity must be interdicted. The diet should consist of easily digested foods, preferably taken in small amounts frequently, and rest should be advised after meals. The bowels should be free and all possible foci of infection should be eradicated. If a history of syphilis or positive evidence be found of this specific disease, intensive antiluetic treatment should be followed out rigidly each year. Diathermy has recently been proved to be of considerable benefit in these cases and it is given for 15 or 20 minute periods twice or three times a week for a month or six weeks.

Finally, if all of these measures fail, operative interference must be undertaken, and if the individual's condition be considered, severance of the sympathetic chain on one or both

sides of the neck should be performed, as well as section of the depressor branch of the vagus nerve.

In the treatment of the secondary forms of angina we must rely upon the removal of the primary disease. Search should be made for possible foci of infection, structural disease, or functional derangement, and treatment should depend upon the results of such examination. It is important in these cases to emphasize the secondary nature of the heart affection and to build up the general nutrition of the body and to insist upon some form of graduated exercise. For the temporary relief of the painful attacks the employment of the nitrites, diuretin, bromides, counter-irritants and diathermy may be employed.

An Address

ON

OTOLARYNGOLOGY AND THE GENERAL PRACTITIONER

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MEN engaged in the practice of general medicine have an interest in all phases of medical practice. Because of the great frequency with which acute infections involve the respiratory tract there is perhaps no field of work with which his contact is more frequent than in the field of otolaryngology. Experience as instructor of undergraduate medical students has convinced me that the preparation of men for general practice should include a presentation of as many of the problems with which the specialist in otolaryngology has to deal as the time allotted to this work will permit, and that it does not matter so much what problems are discussed as how the matter is presented. I have but a single reservation to make and that is, I do not attempt to teach undergraduate medical students, the prospective general practitioners, details regarding operative work. I feel that the general practitioner has no legitimate interest

in the technique of operations in a specialty like that of otolaryngology, for the reason that it is quite impossible for him to encompass the whole field of medicine and surgery, and particularly impossible for him to acquire a sufficient background in clinical experience for making the necessary technical examinations, and for evaluating his findings so as to render him capable of appreciating when these operations should be undertaken. I feel emphatically that it is improper to teach men the technique of operations who have not acquired the ability to recognize the indications for such work, and that it has been the disregard of this elementary principle that has been responsible in a large measure for the flood of indiscriminate surgery in the nose and throat, that has begun to attract the attention of the whole medical profession, and to bring a deserved opprobrium on the specialty of otolaryngology. It has been stated by a careful

student of statistics that tonsilleotomies alone constitute 25 per cent of all surgical procedures. I leave it to you to surmise how many of these operations must be classed as indiscriminate; that is, operations without proper indications.

There has developed in recent years an increasing tendency for general practitioners to come to our special clinics, where they remain only long enough to pick up the technique of some of our operations. It is not surprising, therefore, that the field of otolaryngology should become a favourite ground for the development of surgical fads, in which with no palpable justification this or that region of the nose or throat is held responsible for all sorts of local or general symptoms. One can witness almost any day, especially in many of our smaller hospitals, a line of paediatricians, general surgeons and general practitioners, each coming with a string of patients for nose and throat operations. An obligation surely rests with the specialist in otolaryngology who is sponsor for the work in this field to protect, as far as he is able, this work from exploitation and abuse. It is with this purpose that I undertake to discuss some of the clinical problems that interest those engaged in general practice.

Although we are finding more indications for the removal of tonsils than we recognized twenty-five years ago, I have the feeling that the indiscriminate removal of tonsils constitutes to-day an outstanding abuse in the practice of medicine. As a matter of fact, the problem of deciding, when it is proper to remove the tonsils is not the simple matter it is often supposed to be. The history of recurring attacks of acute tonsillitis, or of a simple attack when complicated by a serious systemic infection, such as nephritis, rheumatism, or endocarditis, the presence of persistent enlargement of these structures, particularly when this is associated with evidence of chronic inflammation, or when there is involvement of the cervical lymphatics, constitute indications for operative removal which are generally accepted. The abuse in tonsil removal has arisen from the interpretation of the universally found condition of cheesy concretions as evidence of pus in the tonsils, and the removal of the tonsils for this as the sole indication. As a matter of fact, if this is a proper indication, then there is scarcely anyone who should

not have his tonsils removed. This is, however, what is actually taking place in some places, where one rarely meets an adult who has not had his tonsils removed, and inquiry brings out the fact that they were removed because they were full of pus. The actual presence of pus in the tonsils is, we concede, an indication for their removal, but this condition is a rare occurrence. Another reason for the indiscriminate removal of tonsils has been the increasing tendency to refer the source of trouble to them in every case where there is a suspicion of systemic infection, irrespective of whether there exist any local indications. Where the chief indication consists of a suspected relationship with systemic infection, probably the best way to proceed in order to avoid the risk of doing a lot of unnecessary operating is to have the internist who is sponsor for the general condition assume the responsibility of deciding whether the tonsils should be removed.

PROBLEMS ASSOCIATED WITH INFECTIONS OF THE NASAL SINUSES

Difficulties associated with the clinical problems of sinus disease arise from several sources. The chronic form of sinusitis often exists without producing any outstanding symptoms; and the symptoms which are looked upon as most characteristic of sinus infection, such as increased nasal discharge, post nasal catarrh and local discomfort, occur more frequently in patients in whom there is no sinus disease than in those in whom it is present. There is also a more or less widespread impression, that the diagnosis of some involvement of the sinuses presents such difficulties, that one is often forced to rely for the diagnosis upon these symptoms rather than upon positive objective evidence. As a matter of fact, a rhinologist properly trained in the technique of rhinological examinations, and with a sufficient background of clinical experience to render him capable of evaluating his findings, will rarely experience any difficulty in reaching a definite conclusion regarding the presence or absence of sinus disease, especially when he has the assistance of properly made skiagraphs. One hears not infrequently about operations disclosing sinus disease, where no objective findings existed, and where the skiagraph was entirely negative. It

is not without interest to note that just those men who have made a reputation for careful examinations, and who have a sufficient background in clinical experience are those who do not discover situations of this sort.

Much in recent years has been written about the occurrence of vacuum headaches, and elaborate theories have been worked out to explain the development of chronic forms of obstruction leading to the rarefaction of air especially in the frontal sinuses, and the production of vacuum headaches. Experience increasing with years has made me more and more sceptical regarding the occurrence of these vacuum headaches. Cases which at one time I had suspected of having this condition usually turn out, on closer observation, to be migraine headaches. As a matter of fact, the whole theory of a vacuum being capable of producing protracted headaches seems to me improbable. Granting that the closure of the naso-frontal duct may occur, the resulting negative pressure, arising from the absorption of the air within the sinuses, should promptly result in the filling of the sinus with a transudate which just as promptly must relieve all negative pressure. As a matter of fact, in just those conditions which most effectually close the frontal duct, for example, the presence of nasal polypi, the symptom of headache develops only when, as the result of infection, the sinuses become filled with an exudate.

Optic neuritis as a possible complication of infection in the posterior ethmoid and sphenoid, has been attracting a great deal of attention since the relations of the optic nerve to the sphenoidal sinus and to the posterior ethmoidal cells have been clearly pointed out especially by Onodi and Loeb. It is quite apparent that optic neuritis may occur from an extension of infection in these sinuses, but it would seem that a great deal too much has been assumed in regard to the frequency of such complications. When such a serious condition is threatened as permanent blindness from an optic neuritis, the rhinologist should be ready to carry out an operation for draining the posterior ethmoid and sphenoid whenever the ophthalmologist feels satisfied that there is no other likely cause for the nerve involvement, and when, in spite of our negative findings, he advises the operation. However, when the

operation fails to discover any palpable evidence of a pathological condition, one is hardly warranted in concluding that the recovery from the neuritis is the result of the operation. It should be pointed out in this connection that it is usually urged that an early operation is more likely to produce favourable results. In early cases, it is not always possible to differentiate those in which a spontaneous recovery may take place. When the optic neuritis recovers after an operation upon the ethmoid and sphenoid in which no palpable evidence of any pathological condition is discovered, the recovery in my opinion takes place in spite of the operation and not because of it.

Another phase of sinus disease, which it seems to me has in recent years been overstressed is the involvement of the sinuses in young children. As a matter of fact it has long been recognized that even in young children the acute infections of the respiratory tract are about as prone to be associated with an infection of the existing nasal sinuses as is the case in adults. There is, however, this striking difference. In children, because of the undeveloped state of these sinuses, and the absence of those conditions which in adults tend to produce chronicity, there rarely exists any indication for operative treatment except in those rather unusual situations in which the ethmoidal disease produces local complications of the orbit.

In some quarters the fact seems only recently to have been discovered, that it is possible even in young children for the sinuses to be involved in infections of the respiratory tract, and with this discovery has developed a tendency to hold the sinus involvement responsible for the entire clinical phenomena, including the bronchitis, and any systemic infection which may have developed in the course of the acute infection; as a consequence the recommendation has been made rather glibly, particularly in those cases in which there is suspected systemic infection, to eradicate by surgical measures the sinus disease. The impression is left that the eradication of sinus disease by surgical measures can be accomplished in about the same way that infection of the tonsils can be eradicated by surgical measures. This fact we regard as a serious clinical blunder. It has already led some to resort to the surgical

treatment of the sinuses in children in whom no justifiable indication exists for such measures.

I am convinced that operations upon the sinuses in young children is rarely called for, and that such operations should be restricted to those conditions which produce some local complication. The ordinary acute sinus involvement encountered so frequently in children as well as in adults in association with an acute infection of the respiratory tract requires in children no more radical treatment than that usually applied to adults. Simple astringents applied to the nasal mucosa suffice for most of these conditions.

The ethmoid has in recent years become a favourite hunting ground for the faddist. Struck, perhaps, with the remarkable anatomical variations in the construction of the ethmoid labyrinth, the idea has arisen that the diagnosis of ethmoidal disease presents unusual difficulties, and to supposed disease in the ethmoid has been attributed almost every local symptom about the head. Operative treatment has been recommended even in cases in which an examination has failed to bring to light any evidence of ethmoidal disease. As a matter of fact, the ethmoid is, perhaps, the most accessible of all the paranasal sinuses, and the diagnosis of disease in it presents no greater difficulty than in any one of the other sinuses.

RELATION BETWEEN AFFECTIONS IN EAR AND DISEASE IN NASOPHARYNX

The relation between disease in the nose and throat and some affections of the ear has been the source of widespread confusion, resulting in a great deal of uncalled for operating in the nose and throat for the relief of ear conditions, that have no relation to the nose and throat. The difficulty has been two-fold: first, the failure to recognize clearly the types of ear conditions that may be brought on by nose and throat trouble; and second, the failure to understand clearly just what alterations in the nose and throat are capable of affecting the ears. Now the types of ear trouble which are affected by nose and throat conditions are the tubo-tympanic processes, and include those resulting in a closure of the tube with impaired ventilation of the middle ear cavities, and inflammatory processes involving the middle ear. Cases of internal ear deafness as well as those cases of progressive obstructive

deafness of middle life, and otosclerosis, are all excluded. Otologists have been slow to recognize the fact that the tubo-tympanic processes so common in childhood are rarely prolonged as active processes into adult life, and therefore rarely have any relation to those cases of progressive deafness, which in middle life result so often in a severe handicap.

The conditions in the nose and throat which may be responsible for middle ear disease are rather definite. In the first place, there are the acute inflammations of the membranes of the nose and throat such as acute pharyngitis and acute tonsillitis which, by direct extension, often lead to inflammatory disease of the middle ear. In addition to these inflammatory processes, there are those conditions in the nasopharynx which by their presence, either from mechanical pressure or local irritation, produce tubal occlusion and tubal catarrh. Adenoid enlargement, particularly in children, is a most conspicuous example, but exactly the same condition may result in adults from tumours in the nasopharynx, and particularly from the development of malignant growths in the vault of the pharynx.

It has been affirmed that enlargement of the posterior ends of the turbinal bodies, because of their proximity to the tubal orifice, may occasionally act in the same mechanical way, and produce tubal catarrh. It should however be kept in mind that the tubal catarrh of which we are speaking is the type which occurs in connection with adenoids, and is not the adhesive tympanic process, which produces rigidity of the conducting mechanism in adult life. I emphasize this point, because only last year there appeared in the *Journal of the American Medical Association* an article proposing cauterization of the posterior end of the lower turbinated body for the relief of chronic progressive deafness. There is here clearly a confusion of the type of ear trouble, which might owe its origin to an enlargement of the turbinal body and chronic progressive deafness, otosclerosis, or occasionally an adhesive middle ear process, which bears no relation to the tubal occlusion caused by adenoids, or from irritation by an enlarged turbinal body.

There is perhaps no more common error in the practice of otolaryngology than that of correcting the anatomical variations in the nose, particularly the irregularities of the nasal

septum, for the relief of progressive deafness due to obstruction in sound conduction. These cases are usually the hereditary type of deafness—otosclerosis. Even in the cases where an adhesive middle ear process is responsible for the obstructive deafness, this condition is not dependent upon obstruction to nasal respiration, a fact that in recent years has been repeatedly emphasized by men who make careful observations. It is generally recognized that obstructions to nasal respiration, unless due to alterations in the nasopharynx, even obstructions resulting in the complete atresia of the choanæ, do not cause middle ear disease. It is exceedingly common in these days for us to see patients suffering from typical hereditary deafness, otosclerosis, in whom all the structures in the nose and pharynx including tonsils and adenoids, the septum and often the turbinated bodies have been sacrificed by operative measures.

It may not be out of place in a paper like this which aims to point out some of the fallacies in the practice of otolaryngology, to call attention to some of the more bizarre forms of treatment, with which those suffering from incurable deafness, the result of degenerative changes in the ear, are constantly being pursued. I shall not attempt to point out the various contrivances, devised by enterprising manufacturers for this purpose, although exploitation along these lines has been extensively carried on. I shall refer only to a few of the more outstanding frauds that are being exploited.

One of the first, chronologically at least, and one which, I understand, has already about run its course, is the treatment of the pituitary body with attenuated x-ray. Another is the so-called "finger surgery" of the eustachian tube which consists of introducing the finger in the nasopharynx carried out, of course, under general anæsthesia so that the patient is duly impressed, and for which a large operative fee is exacted. The third is the exploitation of one of the oldest methods of treating the middle ear, namely, the passing of bougies through the eustachian tube. All of these are being carried out on patients with progressive deafness the result of degenerative processes, which have nothing to do with tubal disease, and none of which could be influenced in the slightest by local treatment. The fact that the victims of incurable deafness

flock to the charlatan for treatment is only an illustration of the well-known phenomenon, that it does not matter how foolish or absurd one's fad may be, all that is required to victimize the public is the possession of the faculty of good salesmanship.

If any one has doubt regarding the impossibility of influencing chronic progressive deafness by any of these methods, or for that matter, by any other form of local treatment, I would recommend that he spend a few hours looking up what every practising otologist should know regarding the nature of the pathological changes that are producing the deafness. He will find that they are clearly quite beyond any possibility of repair. The cure of progressive deafness does not lie in the local treatment of an ear, but is to be looked for in discovering the cause which in most instances appears to be systemic disease rather than any local condition.

ACUTE OTITIS MEDIA IN YOUNG CHILDREN

Quite recently attention has been called in some quarters to the menace of acute otitis media in young children in association with a persistent or recurring gastro-intestinal disturbance, and the recommendation has been made to carry out operative drainage of the antrum through the mastoid in cases even where there exists no palpable local indication for operative measures. Here again I feel that a serious error in surgical judgment is being advised. As a matter of fact, acute otitis media in young children has long been the subject of careful study by otologists. For many years I have been working in a large general hospital where we have, what we believe to be, an efficient pædiatric department, and our staff is very often called upon to examine the ears of young children suffering from various conditions. As everyone should know, otitis media is a frequent cause in young children of elevation of temperature, and it is a very important measure to establish drainage in such cases by incising the drum membrane, a measure which we have felt should be carried out whenever the general condition indicates an infection and when an examination of the ears discloses an acute otitis media even though there may be complete absence of palpable evidences of bulging of the drum membrane or contraction of the fundus of the canal. That complications such as meningitis, sinus thrombosis and inva-

sion of the osseous structures may arise in the course of otitis media because of delay in securing proper drainage through the opening of the drum membrane, or in spite of early drainage, is common knowledge. The point I desire to make is that with developing evidence of complications, such as these, the establishing of proper drainage through incision of the drum membrane can be expected to accomplish in young children all that can be looked for from the more formidable measure of opening the antrum. The reason for this conclusion is quite evident when one recalls that in the infant the only pneumatic spaces that exist are the tym-

panum and the antrum with a wide communicating channel, the aditus, and that it is of relatively little importance from which of these the drainage is secured; that is, whether it is through the tympanum by incising the drum membrane, or through the antrum by operating on the mastoid.

In conclusion I desire to state that although in this discussion of some clinical problems in otolaryngology I have endeavoured to point out some errors in practice, I do not wish to leave the impression that work in this field is in any sense decadent. I believe the outlook for the future advancement of this specialty was never brighter.

OBSTRUCTIVE LESIONS OF THE GASTRO-INTESTINAL TRACT*

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ACUTE obstruction in the gastro-intestinal tract is the *bête noire* of the surgeon, and many of our most unhappy experiences are associated with the handling of such cases. This is true because late operation is the rule rather than the exception. There is no other condition in which the lapse of time means so much to the patient. If the operation is done within ten or twelve hours after the onset, the mortality rate is little more than that of other abdominal conditions demanding operation, and it is then usually possible to do a permanent and complete operation. After these few hours have elapsed the mortality rate soars until it reaches at least from 15 to 20 per cent at the end of the first twenty-four hours, and from 35 to 40 per cent in forty-eight hours. We are obliged to face a general mortality rate in this condition of approximately 50 per cent. This state of affairs is not improving. While our death rate from nearly every other operative condition is showing a fairly satisfactory decrease, this ghastly mortality from gastro-intestinal obstruction stands at a figure which

does not reflect much credit upon the medical profession.

Obstructive lesions of the gastro-intestinal tract will always carry a fairly high degree of mortality because of diagnostic difficulties, but the study of my own records as well as hospital records covering such conditions has long since convinced me that we are not applying ourselves as seriously as we might be, to a reduction of the mortality associated with this reasonably common condition. I have selected fifteen cases from my own records of the past five years in which operation took place, and while I shall not attempt to draw conclusions from such a small series, the fact remains that late diagnosis was an important feature in every one of them, and they have been selected for this special reason. Time will not permit of a presentation of the individual histories, but we may group the cases as follows:—

Two cases of acute obstruction of the pylorus; one in which duodenal ulceration had progressed to the point of complete obstruction before the patient was presented for operation; and one of carcinoma of the stomach which was first seen in acute obstruction. This latter

* Read at the Annual Meeting of the Canadian Medical Association, Toronto, June, 1927.

patient maintained that he had never had a dyspeptic symptom in his life until two days prior to his operation. Another case of fairly complete obstruction of the pylorus presented a history of gastric symptoms for four years. She had been treated for a gastric neurosis but operation disclosed an old cicatrix from duodenal ulcer which had caused a very marked gastric retention.

The next case in the series is extremely interesting from the fact that she was presented as a case of acute obstruction at the splenic flexure due to a chronic perforation of the stomach, the result of carcinoma. Adhesions associated with the perforation caused the obstruction. The gross signs of carcinoma at the operation were very meagre; she was relieved of obstruction by a lateral anastomosis between the transverse and descending colon, under novocain and gas oxygen anaesthesia and the case might have passed as peptic ulcer had not the patient sustained a pathological fracture of the femur on her first attempt to walk. This patient had been treated for sciatica for over one year prior to the onset of the acute obstruction.

There were five cases of carcinoma of the large bowel, which were only seen in the stage of acute obstruction: two involving the caecum, two the pelvic colon and one the hepatic flexure. The last case occurred in a very intelligent woman, who claimed that she had had no symptom other than obstinate constipation, until the onset of the acute obstruction. She had been obstinately constipated during her entire life. The other four cases gave characteristic histories of chronic intestinal disturbance, and might have been diagnosed before the stage of acute obstruction.

A group of four cases following abdominal operations had all presented signs and symptoms for some years. One of them had had an appendectomy twenty years ago. Periodic attacks of subacute obstruction had been the chief complaint for several years, and the patient exhibited such a marked secondary anaemia that a blood transfusion was considered necessary before operation.

One case of acute obstruction in an elderly woman was presented in such an advanced state that only colostomy under novocain was possible, and the patient struggled along with

an artificial anus until her death three years later.

The last case gave a history of chronic obstruction for several years which at the operation proved to be due to a dense band of adhesions across the pelvic colon; evidently the result of an old salpingitis.

From the histories of thirteen of these cases, we might reasonably have expected that a diagnosis of chronic obstruction was possible before the acute stage was reached. The treatment would have been simplified, the mortality materially lessened, and this number of emergencies would have been converted into fairly straight surgical procedures greatly to the satisfaction of patient and surgeon alike. That this state of affairs, however, is general is well borne out by reference to the records of the larger hospitals, thus indicating that a more vigorous effort to diagnose and treat the favourable cases of chronic obstructions in the gastro-intestinal tract before the acute stage is reached, should effect a material reduction in the death rate.

A study of one hundred consecutive cases of obstructive lesions of the gastro-intestinal tract at the Victoria Hospital in London, may be analyzed as follows:—

Pyloric obstruction, twenty cases, of which were twelve acute and eight chronic, with ten deaths. Acute intestinal obstruction, forty-five cases; intussusception, eleven; due to other causes in small intestine, five; large intestine, twenty-nine. There were twenty deaths in this series, 47 per cent. Chronic intestinal obstruction, thirty-five cases; carcinoma of large intestine, ten cases, of these three operations with two deaths; peritoneal and omental adhesions, twenty-five cases with twelve operations and no deaths.

Excluding carcinoma and intussusception there were fifty-nine cases of intestinal obstruction. Thirty-five of these gave a history of a previous abdominal operation. This is about the usual percentage, and would surely suggest that more careful abdominal surgery would cut down the number of cases of obstruction, and thereby reduce mortality. Exclusive of intussusception there were thirty-four cases of acute intestinal obstruction. Thirty of these presented a history of chronic obstruction for months and some of them years. Yet they came to operation as

cases of acute obstruction and participated in the 47 per cent mortality. These statistics bear out the conclusions drawn from the few personal records quoted, and I feel convinced that surgeons in general will agree that such is their usual experience. The twelve cases of chronic obstruction due to adhesions which were operated upon were all potential cases of acute obstruction. There was no mortality and we have reason to believe that the danger of future acute obstruction has been lessened if not entirely eliminated. Thirteen cases in this group were not operated upon for various reasons.

The majority of the obstructive lesions follow previous abdominal operations, inflammatory conditions of the abdomen and pelvis, or ulcer of the stomach or duodenum. A history of any of these conditions together with any group of signs or symptoms suggesting obstruction should indicate most careful examination to establish or eliminate definite obstruction.

An examination by means of the x-ray is our greatest aid in such cases. My usual practice is to have a barium enema given first, and I like to observe the screening with the radiologist. The behaviour of the intestine while filling is often of great assistance in the interpretation of the plates. The visualization of the entire large bowel, and often the terminal ileum, is perhaps better accomplished with the enema than by any other method. After the lapse of twenty-four or forty-eight hours the usual barium series is done, with immediate, six, and twenty-four hour plates. The screening of the stomach is of course carefully observed. Spastic conditions sometimes simulate mechanical obstruction and the use of atropine with a repetition of the x-ray examination is sound practice when simple spasm is suspected. Even at the risk of being accused of septicism, it is safer to see the same pathology demonstrated on two occasions than to resort to operation hastily, and perhaps fail to find the condition, suggested by the x-ray examination.

In the course of a complete x-ray examination we see many fantastic pictures of apparent chronic obstruction, especially in the large bowel. These patients are almost invariably of the neurotic type and pain is their chief complaint. In the absence of some definite physical sign or symptom of mechanical obstruction it is safer to classify them as intestinal stasis, in

which operation is very seldom indicated. Most of them are suffering from various degrees of visceroptosis.

We are all well aware of frequent disappointments associated with operations for the relief of adhesions, but the use of omental grafts has been of great assistance to me in the handling of such cases. Extracts from two of my cases will illustrate.

A female age 22. Chronic intestinal obstruction with several slight acute exacerbations following operation for appendicitis with abscess some two years ago. An x-ray examination showed a horse shoe shaped portion of ileum closely adherent to the cæcum and ascending colon. The two ends of the horse shoe loop were very closed approximated. The x-ray findings were verified at operation. The adhesions were separated by knife dissection and the raw surfaces were covered with flat omental grafts loosely sutured into position. The patient made rapid recovery, quickly regained her normal weight and strength and has never had a gastric or intestinal symptom since her operation, now four years ago.

A female age 42. Chronic intestinal obstruction with the usual symptoms following operation for appendicitis. An x-ray examination showed extensive adhesions between the transverse and ascending colon as well as the cæcum. The findings were verified at operation. Dense adhesions were separated by sharp dissection and omental grafts applied. The patient had a normal convalescence, and has been free from symptoms since operation, now three years ago.

The ulcer cases causing obstruction of the pylorus should be recognized long before the lesion becomes complete. Abnormal gastric retention is not difficult to demonstrate; it may not be quite so easy to differentiate between mechanical and spastic obstruction but there is a persistency about the former which is not the rule in the latter type of obstruction and this should lead to a proper diagnosis. The acute ulcer which perforates or bleeds without previous symptoms of gastro-intestinal disturbance is not the type which causes obstruction.

We have all seen cases of carcinoma of the large intestine which carry on to complete obstruction without signs or symptoms but such cases are the exception and not the rule. Most of these patients suffer from a train of gastro-intestinal symptoms which after forty years of age, or for that matter at any age, should always indicate a complete methodical examination of the entire gastro-intestinal tract. Such an examination will usually disclose signs of a gross pathological lesion long before the stage of acute obstruction.

The second phase of our effort to cut down mortality should be directed toward earlier

recognition of acute obstruction and earlier operation. If we are to wait for a classical picture of the condition, or until our patient and his friends think that he is sick enough to require operation, then we are courting disaster. We have no control over the patient who is foolhardy enough to refuse operation until he is *in extremis*. He unfortunately pays the price of his folly with his life.

Marked distension and signs of shock are late manifestations. If the history of the case sounds like acute intestinal obstruction, and the patient's condition is becoming more alarming it is high time to think of operative interference. Is it not a fact that operative treatment is indicated in most of the acute abdominal conditions, which might be confused with acute intestinal obstruction? Valuable time is often lost in the attempt to make a too exact diagnosis. A general diagnosis of acute obstruction within the gastro-intestinal tract is an indication for operation unless the obstruction can be promptly relieved by some simpler measure. It is well to locate the source and assign the probable cause of the obstruction if possible, but to lose valuable time over these things while the patient is being poisoned by absorption of toxins, and his intestines paralyzed or gangrenous is surely a serious error of judgment.

No one will dispute the fact that operation is the only safe treatment for intestinal obstruction in the acute stage. If this condition is even seriously suspected, would it not be wise to get the patient into hospital at once. This is especially important if the patient has some distance to travel. We are justified in making an attempt to relieve the obstruction by enemas, eserine, pituitrin, atropine and other simple means—never by laxatives. I have recently relieved two cases of acute intestinal obstruction by giving an enema of eight ounces of barium in one quart of milk. The barium, because of its weight, seems to penetrate and the treatment is well worth a trial, but to try all these things at home and then deliver the patient to the hospital and to the surgeon in a state of commencing shock, and with a fully distended abdomen is the very thing which is doing the most to keep our mortality where it is.

A properly taken history is, perhaps, more important than the physical examination in the early stages of acute obstruction, but it requires

much longer to get it. Is this a wild statement, or is it a fact? If it is a fact then our first duty is to take the necessary time and pains to elicit a real history of the present illness as well as of the previous history of the patient. History taking is a real art and requires time, patience and perseverance, if the information is to have value in making a diagnosis.

Pain is the most constant single symptom of acute obstruction. Very severe and paroxysmal at first, then becoming steady and soon accompanied by some local tenderness; usually in the region of the obstruction. It is not wise to administer morphine until some effort is made to, at least, establish a provisional diagnosis. If the application of heat and the use of less potent sedatives fails to give some relief, then we should at once become suspicious of some serious condition within the abdomen. If we have been able to eliminate biliary and renal colic, such severe pain with a history of more or less obstinate constipation would be strongly suggestive of acute intestinal obstruction. If we are obliged to give morphine the patient usually gets complete and permanent relief, if the condition is one of simple spasm of the bowel. A return of the pain requiring another, and perhaps, a larger dose of morphine points strongly to mechanical obstruction.

Vomiting is another very constant symptom. Coming very early in lesions of the upper portion of the small intestine; very profuse and soon becoming dark in colour. It is not usually accompanied by nausea. Early and repeated examination of the vomitus for the presence of intestinal contents should be made.

In the absence of indications of some inflammatory condition within the abdomen these two symptoms as described, together with the history, will go a long way towards making a diagnosis of acute intestinal obstruction. Blood or bloody mucus in the stool are important aids to diagnosis, especially in intussusception, and we need hardly mention the tumour mass, which is so frequently palpated in this condition. We have probably had our enema returned with faeces and flatus, coming from the segment below the obstruction, but subsequent enemas proving ineffectual. An x-ray examination with a barium enema will usually settle the question for us, if the obstruction is in the large intestine. Auscultation of the abdomen in very

early cases is valuable if sounds of violent peristalsis are demonstrated, but the sign is not always present.

In acute obstructions of the small intestine, especially of the jejunum and upper ileum certain changes in blood chemistry are fairly constant. A marked rise in the blood urea with a fall in plasma chlorides is strongly suggestive of high intestinal obstruction, if we can rule out renal pathology.

Acute post-operative ileus is the subject of another paper at this meeting and for this reason I shall not touch upon it.

Surgical judgment is a great asset and there is no emergency which calls for such rare quality of judgment as the type of operation indicated in cases of acute intestinal obstruction. The first consideration in any emergency is of course to save life. Patients suffering from acute obstruction cannot stand much surgery, and they tolerate general anaesthetics very badly. Even the advanced case of acute obstruction may get out of it with his life, if the surgeon will content himself with a simple enterostomy or a colostomy under local anaesthesia, and think of the classical operations later, when he is not dealing with an emergency. If this rule could be generally accepted, many lives might be saved.

Within the first twenty-four to thirty-six hours, with a patient in good physical condition, it is good surgery to look for the cause of the obstruction, under general anaesthesia, and remove it if possible. In the later operations, which represent the bulk of our cases, we are not justified in unduly prolonging the operation in our search for the cause; neither are we justified in doing the more radical operations

unless the patient's general condition is good enough to give us reasonable assurance that he will stand the operation. The mortality in this group is bound to be high because we are operating upon very sick patients. While we may hate to face the patient on the following day with faecal discharge running out over his abdomen, and the spectre of another operation hanging over his head, a colostomy in this state of affairs has always seemed to me to be a lesser evil than to face the friends and relatives with the story of a glorious operation and a patient in the morgue, when we know full well that simple drainage of the bowel might have saved his life.

Conclusions

There are five important considerations in the attempt to reduce the mortality of obstructive lesions of the gastro-intestinal tract.

1. Better diagnosis and earlier operative treatment of the favourable cases of chronic obstruction, before the stage of acute obstruction is reached.
2. Earlier diagnosis and earlier operation in the acute cases.
3. More careful abdominal surgery so as to lessen the incidence of peritoneal and omental adhesions.
4. A greater readiness on the part of the surgeon to do a simple drainage operation for acute obstruction, if such a course gives the patient a better chance for his life.
5. The elimination of general anaesthetics in favour of local anaesthesia in late cases where simple drainage of the bowel is the operation of choice.

In an article on the action of atropine on milk secretion, by Professor Stockman, which appears in the June issue of the *Edinburgh Medical Journal*, the writer states that the administration of 1/100 grain atropine sulphate hypodermically morning and evening for the first seven days after labour is sufficient to stop the flow of milk in most cases. When this treatment is not quite effectual, a dose of magnesium sulphate given on one or two successive mornings will suffice to check the flow completely.

At the National Congress of Legal Medicine convened recently in Florence "the importance

of the constitutional factor in the causation, the amount of damage, and the settlement of industrial accidents," was treated by Prof. Cesare Biondi of the University of Siena. He recalled the importance attributed by certain Italian authors (Pieraccini and Maffei, Merin) and by American authors to the factor of the individual in the causation of accidents, emphasizing that subjects who react more readily to their emotions and who are unable to check their psychomotor and neurovegetative reflexes are more likely to meet with accidents. The constitutional factor seems to have great importance.

POST-OPERATIVE ILEUS

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ACUTE intestinal obstruction in any form is one of the gravest emergencies with which a surgeon has to deal, carrying with it a very high mortality, even under the very best condition for diagnosis and treatment. When the condition comes on shortly after an abdominal operation, it may well be called a calamity. As the only means of lowering the high mortality depends on early diagnosis and sane surgical treatment instituted at the earliest moment, one feels justified in introducing such a well worn subject, even if the presentation contains nothing new.

It has been repeatedly stated that the surgeon as a rule sees cases of acute intestinal obstruction for the first time when it is already too late to operate with much hope of success, and the patient and the medical attendant are blamed for delay in calling counsel. It must be noted, however, that, while most cases of early post-operative ileus occur while the patient is in hospital and under the care of a surgeon, the same delay frequently occurs, and often with a fatal result. This lack of promptness of action is due primarily to the difficulty in diagnosis, and secondarily to the hope that the obstruction is only partial, and will clear up under treatment less radical than operation. Another undoubted cause of delay is that no small degree of courage is required to face the patient and friends and announce the necessity of another operation after the abdomen has once been closed.

By post-operative ileus is meant a condition in which there is a cessation of the normal mechanical functions of the intestinal tract after an abdominal operation. The factors concerned in its production may be mechanical hindrances on the one hand, or paresis of the intestinal musculature on the other. Whatever the mechanical cause may be, sooner or later the nerve mechanism governing the peristaltic action of the bowel is interfered with, and a paralytic factor comes into play, adding to the gravity of the condition.

In certain forms of obstruction, such as that associated with general peritonitis, the cause of the obstruction is inherent in the bowel itself, consisting in a loss of muscular contractility. The same may be said of cases in which a portion of the bowel has been severely traumatized during operation. In these cases of paralytic obstruction the intestinal tube is unable to pass on its contents and the obstruction is as complete as if the lumen were blocked.

Judging from the result of autopsies and also from the clinical course of patients who have recovered after early enterostomies, one is inclined to believe that mechanical barriers play only a minor rôle in this form of obstruction. It is not by any means an uncommon occurrence that a patient who presents a clear picture of acute intestinal obstruction, will be promptly relieved of these symptoms by an early enterostomy. The bowels will soon move naturally and before long the fistula will close itself without further operation.

Professor Wilkie, however, makes the statement that whilst adynamic post-operative ileus may and probably does occur, it should never be diagnosed until an organic cause for the symptoms has been definitely excluded. Ever since it was possible, he states, some seventeen years ago, to show experimentally that a fatal obstruction may result from recent and apparently trifling adhesions of the small intestine, an organic cause has been suspected in all these cases and has usually been found.

Paralytic ileus may supervene on the release of a mechanical obstruction, and immediate action is just as imperative as in cases where there is a mechanical barrier.

Intestinal obstruction may follow in the wake of any abdominal operation, but it more frequently follows an operation for appendicitis than operations for other conditions. It may come on at any time after operation. When it occurs within a few days it is usually due to

peritonitis, either local or general, which causes agglutination of one or more coils of the bowel. Those cases coming on somewhat later, but still during convalescence are usually due to a secondary abscess; later still, often years after an operation, the cause is usually strangulation of a portion of the bowel by a band of adhesions. Approximately, one-half of the cases of intestinal obstruction have their origin in adhesions resulting from previous operative procedures. The most serious and probably the most frequent form of paralytic ileus is that caused by peritonitis affecting the lower half of the abdomen, which is occupied by both large and small bowel. This has been termed by Sampson Handley "Ileus duplex", indicating that both large and small bowels are affected and must be treated.

The usual text-book description of the symptoms of acute intestinal obstruction is inclined to lay too much stress on the later symptoms, and refer only very briefly or not at all, to those occurring early. The characteristic symptoms are pain, vomiting and constipation, and the clinical picture is fairly constant, though these symptoms may vary much in their time of onset, in the group of cases developing obstructive symptoms in the course of a few days after an abdominal operation. Here the purely obstructive symptoms may be masked by those usual in post-operative conditions. The problem then is to differentiate the two conditions and here the most experienced judgment is required to attach to the various symptoms their proper value. The majority of patients, who have undergone abdominal operation, suffer to a certain extent from distention, abdominal pain and nausea. When these symptoms do not soon pass off one must have in mind a serious complication. The differential diagnosis between an acute intestinal obstruction, a secondary abscess and general peritonitis is often extremely difficult. Fortunately, it is not necessary to make an absolute diagnosis. The important point is to recognize those cases which do not respond to gastric lavage and enemata, and in which the symptoms are becoming progressively worse, and to re-open the abdomen before irreparable damage has been done. Practically all of the conditions with which post-operative obstruction is likely

to be confused demand operation as imperatively as obstruction.

Sampson Handley makes the following statement: "Death in general peritonitis is due to obstruction and not to peritonitis as such. The obstruction is, moreover, a local one affecting certain portions of the bowel, not a general paralysis of the whole of the bowels. 'General' peritonitis starts in the pelvis from gravitation of the infected fluid and rises in the abdomen like a flood. Death generally follows before the rising flood of peritonitis has reached much above the level of the umbilicus. The essential thing is to drain the intestine at the level above that at which its wall is paralysed. It will be seen that the object aimed at in these operations is the improvisation of a complete emergency alimentary canal, providing a considerable absorption surface, above the level of the peritonitic fluid.

"If, after an appendectomy, vomiting returns, the pulse fails to fall to normal, flatus ceases to pass in spite of enemata and hypodermic injections of pituitrin and eserine, while the abdomen becomes distended and perhaps rigid in its lower half, the patient's life hangs in the balance. He will not recover unless his medical advisor has sound ideas on the pathology of peritonitis, and the driving power, during the last few hours of grace which remain, to insist upon the necessary operation, either an entero-colic anastomosis or an enterostomy."

Pain may or may not be a prominent symptom. When it is very acute the condition is probably strangulation. The pain is then usually intermittent or colicky in character in the early stages due to excessive peristalsis in the effort to overcome the obstruction. Later it becomes constant. When the intestines become more or less paralyzed or in cases of adynamic ileus, pain is not a prominent symptom.

Vomiting in the early stages is probably dependent as much on toxæmia as mechanical causes. The vomitus at first will contain only normal stomach contents but soon it becomes intestinal in character. Stercoraceous vomiting is a grave sign and usually indicates that the time for successful operation has passed. It does not usually come on before the second or third day and may be long delayed when the obstruction is low down in the large bowel. The higher

the obstruction the more serious is the condition, and the more rapid is the onset of grave symptoms. The passage of the stomach tube in doubtful cases may furnish valuable information as to the character of the stomach contents and followed by repeated lavage may be of great benefit. When intelligently used in cases of suspected obstruction following shortly after an abdominal operation it may prove a means of avoiding re-opening the abdomen, and may become a veritable life saver.

Constipation is an important symptom, but it must not be forgotten that a first and even a second enema may produce a fairly good bowel movement accompanied by considerable flatus. If this does not produce a marked relief and a third enema is ineffectual, a diagnosis of obstruction is warranted.

The determining factors are the intestinal character of the vomitus, the failure of lavage and enemata to relieve the vomiting and distention, an increasing pulse rate, restlessness and thirst. In cases of doubt it is always safer to operate.

It is hardly necessary to state that every available means of examination, that does not involve unnecessary delay, should be carried out. The most important is physical examination of the naked abdomen. Rectal examination should never be omitted. X-ray plates of the abdomen may aid in location of the site of obstruction. Laboratory examinations are not likely to be of much assistance, though estimation of the chlorides in the blood plasma can be done quickly, and may be of some assistance.

Apart from the purely mechanical factor in acute intestinal obstruction, there is another and almost equally important one—the absorption of toxic material from the bowel. Death is due to chemical intoxication developed in the process of protein disintegration. The precise nature of this toxin, whether formed by bacteria or by other action, and the precise mechanism of absorption, are still in doubt. The higher the obstruction the sooner the toxæmia develops, and the more profound its effect. It appears that the poisons absorbed from the upper jejunum and duodenum exert profound metabolic changes, which can be easily appreciated in the blood. The fundamental changes in the chemistry of the blood seems to be depletion of the chlorides. The chlorides are lost

or used up in some manner, and this seems to be related to the process of protein destruction. This fall in the chlorides suggests that they are being used as a protective agent against the toxic body which is absorbed into the blood stream, the nature of which is not definitely known but is probably a nucleo-protein. Further chemical changes in the blood appearing later are an increase in the blood urea, and in the capacity of the blood for carrying carbon dioxide. The estimation of the plasma chlorides, and the non-protein nitrogen content of the blood are valuable as a pre-operative guide to the degree of intoxication, and as a post-operative guide to prognosis.

With the possibility ever in mind of this condition arising after an abdominal operation, every means of prophylaxis should be adopted. Patients should not be deprived of water before operation for any length of time. If it cannot be given by mouth it should be given by the rectum or by a needle into the subcutaneous tissues or into a vein. This is equally important after operation. The body cells require water for proper functioning. The function of the musculature of the intestinal tract depends upon the activity of its component cells.

It is hardly necessary to mention the fact that the intestines should always be handled with extreme gentleness. They should always be kept covered with warm towels when outside the abdomen and should not be allowed to come in contact with the iodine covered skin. All bleeding should be stopped, and all raw surfaces should be covered with peritoneum if at all possible. Indiscriminate use of drainage tubes should be avoided. These undoubtedly play an important rôle in the formation of adhesions and, therefore, of intestinal obstruction. Since, as previously stated, it more frequently follows operation for appendicitis than for any other cause, it is obvious that one of the most important prophylactic measures in the treatment, is to operate early in appendicitis, and to use no drain unless absolutely necessary. I think it is a fact, that drainage tubes are used much too frequently.

The most important factor in the improvement of the mortality rates is early operation. As Wilkie states: "No improvement in our operative procedure or in our pre- or post-operative treatment will ever make good the damage done

by a few hours' delay in the early management of the case."

The changes in the blood, especially the deficiency in chlorides afford valuable indications for treatment. The chloride deficiency may be remedied by giving ordinary or hypertonic saline solution intravenously. The benefits derived from this are threefold:—

1. Replenishment of the depleted chlorides.
2. Retardation of absorption of toxic bowel contents.
3. Stimulation of active peristalsis.

For an average adult 60 to 75 c.c. of 20 per cent sodium chloride solution has been advised.

Whether Haden and Orr are correct or not in their theories in connection with the chloride deficiency, it has been amply demonstrated experimentally and clinically that the administration of chlorides does produce very beneficial results.

If operation be undertaken within 24 or 36 hours it may be possible to separate the recent filmy adhesions which are causing kinks and twists of the bowel with immediate relief. Later on little exploration is advisable and high enterostomy should be done as a life saving measure. As a rule this is best performed through a separate incision. Dr. C. H. Mayo advises an early operation through the original incision, but if five days or more have elapsed another incision should be made. Dr. Deaver advises a separate incision in all cases. The operation proposed by Ravdin is a very good one. In this

the incision is made in line with the anterior axillary fold and just below the chest margin, exposing the proximal part of the jejunum. This can be done very easily under local anaesthesia. A loop of jejunum as near its origin as possible is brought out through the wound and a rubber tube of 7 or 8 inches is inserted through a small opening and fastened in with two purse string sutures. Dr. C. H. Mayo suggests bringing the tube through a hole in the great omentum. In this way the bowel is allowed to discharge its poisonous contents and fluids may be given through the tube to act as an irrigation.

Sir Berkeley Moynihan lays much stress on the advantage in the usual obstruction case of emptying the bowel of its toxic contents by threading the bowel over a glass tube. This is undoubtedly a very valuable procedure, but in early post-operative cases it is doubtful if the extra manipulation of the bowel involved is justifiable.

In adynamic cases the choice between an enterostomy and enterocolostomy combined with caecostomy as advocated by Sampson Handley must depend on the condition of the patient and the experience of the operator. The former will probably be safer for the average surgeon in patients who are in a critical condition.

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Encephalitis Lethargica.—In the annual report for 1926 of the Health Department of London, it is stated that there were 173 confirmed notifications of encephalitis lethargica with 68 deaths. During the years 1919 to 1925 there were 1325 true cases notified with a 37 per cent mortality. A study of these cases shows: (1) that the incidence is highest at the 10 to 20 age-period, and especially at the period from 15 to 20; (2) that there is a slightly higher incidence among boys from 0 to 15 years, although the fatality was slightly higher among girls at these ages; and (3) that the case fatality is greatest under 5 years and over 35 years. The London cases were four times as many as the Sheffield cases which formed the material of the Medical Research Council's Report (No. 108). The London experience confirmed that of Sheffield in that no relation could be traced between the disease and a poor

or insanitary environment and water- milk- or food-supply. In London the susceptibility of young males was less marked and most noticeable at the age of puberty, and not at the time of sexual maturity as in Sheffield. In both experiences it is agreed that statistical estimates of the incidence and fatality of the disease was vitiated by the occurrence of unrecognized, mild, and abortive cases. Dr. Menzies estimates that in London the unnotified cases exceed the notified by 50 per cent. The accommodation of 100 beds at Winchmore Hill is quite inadequate to deal with the after-effects of the disease, and is only a clearing house for juvenile cases. More accommodation is needed for the careful and patient investigation which up to now has thrown no light on causation or effective preventive control.—*Lancet*, July 2, 1927.

ANÆSTHETIC TOXICITY

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THE subject of toxicity of our common general anæsthetics has been so much discussed that it is very difficult to contribute anything new in the way of facts. There is, however, a point of view which I think is too frequently overlooked in discussions regarding anæsthetic toxicity. Of this there may be two types. Toxic action and death may be due: (1) to overdosage or improper administration; or (2) may occur as a result of the essential toxicity of the anæsthetic, although the ordinary bounds of dosage and concentration may not have been exceeded. These statements will require further elaboration. All our anæsthetics are of course toxic, that is, they produce symptoms arising from pathological or pharmacological changes, if given in overdoses. This is true of practically all our drugs. The site of the dangerous action, however, differs greatly. For example death from chloroform may be due to the heart, whereas with ether this is exceedingly rarely the case. Butylene anæsthesia induced slowly, produces a hypertonus resembling cerebrate rigidity to a much greater extent than propylene, and indeed, in my experience, more readily than any other of our anæsthetics, though this may occur in various animals even with ether and chloroform. The action of butylene on the frontal lobes, which are concerned with tonus mechanisms, seems to be much greater than that of the other anæsthetics. This fact alone would detract from butylene being a useful anæsthetic, since the hypertonus often persists to a deep stage of anæsthesia. Butylene has another effect, namely, it tends in anæsthetic doses to cause a very marked fall of blood pressure, doubtless due to a depression of the vasomotor centre. While, therefore, we may talk of the toxicity of an anæsthetic in a general sense, if we wish to speak intelligently we must be precise in our comparisons and indicate the site in the organism where the deleterious effect of the anæsthetic is produced. In regard to toxicity occurring from overdosage or improper use I

shall have relatively little to say, but it is obvious that the anæsthetic of choice, if it is to be employed by the many and not merely by the expert, should show as wide a margin as possible between the dosage in which it exerts deleterious actions of a serious character at any site, and the dosage required to produce anæsthesia. It is in this respect that ether possesses such great advantages over chloroform, and ethylene over nitrous oxide.

TOXICITY OF CHLOROFORM

If we turn to chloroform, the first anæsthetic which came into general use, its toxicity expresses itself in several sites. First, we may mention the fall in blood pressure which almost invariably accompanies its exhibition from an early stage in the anæsthesia, and is due to a depression of the vasomotor centre. This is an unavoidable accompaniment of chloroform anæsthesia, and one which must be borne in mind. I think it has been too little regarded in the past, and accounts for deaths which have been ascribed to the operation rather than to the anæsthetic. I have little doubt that it also increases the dangers of post-operative low blood pressure and shock.

Secondly, chloroform depresses the respiratory centre from the first, and this too contributes to its danger in cases which have been suffering prolonged pain, and in whom the respiratory centres have been for some time receiving an undue inflow of nervous impulses travelling over the collateral connections of the pain afferent fibres. Respiratory failure due to overdosage with chloroform is in the lower animals very difficult to combat. I have had cases where the blood pressure was not seriously depressed, and the heart action good, in which chloroform caused a cessation of respiration. Artificial respiration was employed and tended to improve the blood pressure, but the respiratory centre was slow in regaining its activity, and seemed to be aided but little

by such drugs as adrenalin, atropine, strychnine or cardiazol.

The third site of danger during the administration of chloroform is in the heart. I think the best explanation of a great many cases of early deaths under chloroform is that based on Levy's¹⁵ observations on cats, which have been confirmed by other observers in other laboratory animals. Chloroform produces such a change in the cardiac musculature, that the additional action of adrenalin may produce ventricular fibrillation and rapid death. This effect is only produced in light anæsthesia, and when one considers the state of fright or of pain, so commonly present in our patients, both of which may contribute to an abnormal output of adrenalin into the circulation, it is not surprising that an early effect of chloroform may be ventricular fibrillation with sudden death. When we realize that cocaine sensitizes the nerve endings of the sympathetic, rendering them more readily affected by normal amounts of adrenalin, (the pupils for instance dilate when adrenalin is instilled into the conjunctival sac), it is not surprising that after cocaine has been applied locally to a mucous membrane, sudden deaths have occurred during chloroform anæsthesia owing to the absorption of amounts of cocaine not in themselves sufficient to cause symptoms; the chloroform plus the absorbed cocaine has induced a state in which normal amounts of adrenalin caused fibrillation and death. I have known two or three cases where this seemed an adequate explanation.

The fourth site where the action of chloroform is deleterious is the liver. We are all familiar, at least from the literature, with the fatty degeneration which may occur subsequent to a chloroform anæsthesia. This has frequently been ascribed to some of the chloroform undergoing a change in metabolism leading to the intracellular production of such a body as phosgene (carbonyl chloride). It is very difficult to tell whether any such decomposition of the chloroform occurs in the body, on account of the large amounts of chlorides present. It has, however, occurred to us that possibly this difficulty might be surmounted by the employment of bromoform, so similar in chemical composition and reaction to chloroform, and from which under similar conditions carbonyl bromide can be produced. Dr. Lucas

and Dr. Brown have, therefore, anæsthetized animals with various doses of bromoform usually given per rectum in oil, and have produced anæsthesia of various depths and duration. In all cases pathological examination has disclosed more or less marked changes in the liver, and the liver damage produced has paralleled as nearly as could be expected the degrees of anæsthesia. In prolonged anæsthesia the changes are often extremely marked, resembling in type those produced by chloroform or carbon tetrachloride. We have also been able to demonstrate an excretion in the urine of an inorganic bromide in considerable amounts up to 2 per cent of the bromine contained in the bromoform given, and also the presence of considerable amounts of inorganic bromides in the tissues. These facts definitely indicate that a portion of the bromoform is broken up in the body and that the cause of this peculiar intoxication may be due to this metabolic decomposition. It is perhaps fair to assume that this type of intoxication occurs also with chloroform and may account for the fatty changes found in the liver and in cardiac muscle. Ethyl bromide undergoes the same type of decomposition as was shown long ago by Dresser,⁹ and produces similar liver changes; it is therefore probable that ethyl chloride will have similar effects. The point is being studied in this laboratory, and we have been able, I think, in this experimental work to show the probability of the intoxication produced by this anæsthetic to be dependent in part on its decomposition in the body.

Chloroform then has deleterious effects that are:—

1. Essential in the administration,
 - (a) vasomotor centre depression,
 - (b) respiratory centre depression,
 - (c) intracellular metabolic changes in liver, heart, etc.
2. Due to accessory factors,
 - (a) excess adrenalin action with circulation due to pain, or fright, superadded to the normal changes in the cardiac muscle produced by chloroform.
 - (b) cocaine sensitizing to adrenalin, added to the chloroform cardiac changes.
3. Due to overdose or lack of care or in debilitated cases, and the narrow margin between necessary and toxic amounts in the blood stream.

TOXICITY OF ETHER

The type of toxic action described for chloroform seems hardly likely to occur with ether, whose chemical decomposition will produce

probably only carbon dioxide and water, and there is little reason to suspect the production of any deleterious chemical substances, though very probably some ether may also be broken up in the body. The toxicity of ether depends on its own inherent chemical or physical properties, or upon changes in metabolism produced by its exhibition, and I hasten to point out that this is probably true of some of the toxic features shown by chloroform. Ether is but slightly toxic to the heart, and depresses the vasomotor centre and the respiration but little, though in overdoses the respiratory centre is affected. The marked depression of the respiratory centre due to ether appears to be more easily overcome than that produced by chloroform. Ether, however, does produce very marked changes in metabolism, as has been shown by Wesley Bourne and Stehle,⁴ Leake¹⁴ and other observers. The changes are such as to suggest imperfect oxidations occurring in the body, and it would be interesting to learn whether this was a necessary concomitant of anaesthesia as such. Winterstein and other observers have called attention to the fact that the cells of the central nervous system, (and the same may apply to other tissues), are less able to take up oxygen in the presence of an anaesthetic than they are under normal conditions. The anaesthetic may indeed change both the adsorptive and the chemical characteristics of the cell membrane. This we know occurs under the conditions studied by Warburg on yeast and other cells, and also in the experiments by Lilly on his sensitive iron wires. It is, therefore, readily conceivable that these changes in metabolism are an essential expression of the changes produced in the cells by the presence of the anaesthetic and that the reason why they occur more strikingly with ether is due to the fact that ether is so soluble in water as to permit all the tissue cells in the body to take up relatively large quantities of it.

There is little doubt that one of the disadvantages of ether consists in the pronounced increased secretion of the salivary and bronchial glands. There is no doubt that this is reflexly produced in the main, but this reflex effect seems to be increased by the fact that ether stimulates the central nuclei of bronchial and salivary secretion. The increased secretion occurs not only in the early stages of induction

but also during recovery. How far this is the essential factor in the causation of post-operative bronchitis and pneumonia we do not know.

Perhaps the most objectionable feature with ether is the prolonged post-anaesthetic nausea. This is doubtless contributed to by the metabolic upset of which I have spoken, by the fact that such large quantities of ether are absorbed and are given off for a long period of time, and further, by the fact that ether in low concentrations does undoubtedly seem to sensitize medullary centres to an extent that does not occur with chloroform. I may adduce in support the early stimulation of respiration and of blood pressure occurring with ether. Furthermore, I have not been convinced that the methods suggested for combating post-operative nausea with insulin and glucose will achieve the desired results. It is true that this procedure may help to rectify the metabolic upset, but even of this I am not sure, and so far as I know this question has not been studied by the employment of the biochemical methods now available.

To sum up therefore, the deleterious effects of ether are:—

1. Essential,
 - (a) increased salivary and bronchial secretions;
 - (b) the tendency to upset the metabolism of the body as a whole as expressed by the CO_2 combining power of the blood, and the Ph, and further, by the hyperglycemia and post-anaesthetic excretion of phosphates.
2. Dangers due to overdosage and a debilitated state of the patient which later may be increased by the metabolic changes.

NITROUS OXIDE

As the experiments of Hermann,¹¹ Kobert,¹² Paul Bert,² Bock,³ show, nitrous oxide has practically no toxic effect on the medullary centres or the heart. It seems to be inherently the least toxic of any of our anaesthetics, but it is undoubtedly the least efficient. Indeed Brown and Lucas⁸ have recently published a paper which, taken in conjunction with the work of Greene,¹⁰ I think definitely shows that nitrous oxide as such is an extremely weak anaesthetic and that true surgical anaesthesia cannot be produced by it alone, but only when combined with a certain amount of anoxemia or combined with other depressants of the central nervous system such as morphine or scopolamine. While it is hard to say that nitrous oxide in itself is at all toxic, yet in looking over

the records of a large general hospital I find that there have been six cases of death from nitrous oxide, and eight deaths from other anæsthetics. Of the deaths under other anæsthetics there seems every reason to believe that in seven instances the anæsthetic was not a large contributing factor, if it contributed at all, the operations in themselves being of an exceedingly dangerous character or the patient in an extremely bad state. Whereas in the deaths occurring during the gas and oxygen anæsthesia, there seems little reason to believe that the state of the patient or the character of the operation was any more responsible for the death than was the anæsthetic. I believe that in most of the cases in which gas-oxygen anæsthesia was given over a prolonged period, death was due to the anoxæmia. As Greene has shown, the hæmoglobin carries only some 80 to 85 per cent of its normal load of oxygen during a nitrous oxide anæsthesia. Leake¹⁴ and his co-workers have pointed out that there is a gradually increasing acidosis. When it is considered that all the cells of the body are probably permeated with nitrous oxide, as it is relatively soluble in water, it will be recognized that the presence of nitrous oxide, may prevent the ready acceptance of oxygen by the tissues, and in consequence of the low saturation of the hæmoglobin produce serious oxygen deficiency in the tissues, and grave disorder in metabolism. I believe the deaths that occur in these cases are due to the heart muscle working for a prolonged period of time in the presence of relatively deficient amounts of oxygen. Nitrous oxide may be said to have in itself no essential deleterious effect, but if not supported by morphine or scopolamine, it always produces an anoxæmia which in many cases is dangerous.

ETHYLENE

It is interesting to note that with ethylene the metabolic upset is relatively less than with ether, chloroform or nitrous oxide (Leake and Hertzmann,¹⁴ Oberhelmann and Dyniewicz²⁰), and is probably to be explained in part by the lack of oxygen which occurs in the early stages of deep anæsthesia, and also by a hypothetical inability of the cells to accept oxygen in the presence of an anæsthetic. Though to a somewhat lesser extent than with NO_2 , the amount

of oxygen required for normal metabolism is decreased, which may be of importance in thyroid cases (Lundy¹⁶). It will be noted that ethylene does not seem to depress the movements of the intestinal canal to as great an extent as ether or chloroform, and that in consequence one should expect less frequent intestinal paresis after its administration, (Miller¹⁹). This appears to be confirmed by the data published by Lundy. Post-operative pulmonary complications are less than with ether (Lundy¹⁷). The dangers of overdosage with ethylene appear to lie firstly in the anoxæmia produced, and secondly in its depressant effect on the respiratory centre and on the vasomotor centre. Respiration ceases before the blood pressure has fallen seriously, at all events in animals, though the blood pressure is less than normal. The heart and its centres seem to be relatively little affected, though sensory reflexes through the cardio-inhibitor centre are definitely reduced. It may, however, be noted that the blood pressure may increase in certain patients and this rise may be harmful (Sise²¹). These experimental observations are confirmed by the work of Lundy,¹⁶ Horsley, Jr.,¹² Meeker,¹⁸ and Allgeyer.¹

Ethylene appears then to have little essential deleterious effect, and the only secondary ones are due to a relative anoxæmia, and metabolic changes. Danger arising from overdosage are failure of respiration and blood pressure.

ACETYLENE

As far as may be judged from the literature acetylene can always be given with such ample amounts of oxygen that its exhibition is accompanied by little or no metabolic changes but this point does not seem to have been carefully studied. It does not depress the respiration in anæsthetic doses or even moderate overdoses, but there is a very frequent increase in blood pressure of 20 to 50 mm. (Brandt⁶).

PROPYLENE

Whereas propylene as produced in this laboratory and employed by Brown,⁷ Bonham and myself seemed to be the best anæsthetic gas, it was subsequently found, when tanked, to possess undesirable nauseating qualities and to produce indefinite symptoms of intoxication.

This mystery has not been cleared up. Whether there was a difference in the purity of the propyl alcohol used in the two cases, since they were derived from different manufacturers, or whether propylene undergoes an unknown type of polymerization, has not yet been decided. There certainly seems to be in the tanked propylene a relatively less volatile and very odoriferous substance which was not present, at all events in the same quantity, in the propylene we employed. This mystery has still to be elucidated; it is therefore not necessary to say anything further in regard to the toxicity of propylene. It should, however be noted that were this difficulty removed, propylene would possess the advantage, shared also by acetylene, that ample quantities of oxygen be given; indeed, the quantities would be double those ordinarily employed, and in consequence the body would be given every facility for absorbing oxygen, and (Brown and Henderson⁷) the metabolic upset would be found to be smaller in amount.

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THE NON-SPECIFIC TREATMENT OF PNEUMONIA

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THE search for a specific treatment for tuberculosis, typhoid fever and pneumonia does not suffer by efforts to improve the symptomatic treatment of these diseases. When a specific is found it is probable that at first it will be available only in hospitals where care as to accurate diagnosis, and control of the change of symptoms following treatment may be observed. Such was the history of insulin in diabetes.

Pneumonia is characterized by a severe toxæmia with high fever and tachycardia. Whilst in severe cases the dyspnœa may be extreme, it is the increasing tachycardia that alarms the physician more than any one symptom save perhaps a change for the worse in the patient's colour. The tachycardia and cyanosis

depend upon the circulation, complicated though the colour is, by the failure of the lungs to aerate the blood. Because of the rapidly rising pulse rate, it is common to speak of a "cardiac death." There is good evidence to show that the term cardiac death in pneumonia is a misnomer. There is also strong evidence to substantiate the view that cardiac failure never is the cause of death, but that the rapidly rising pulse with lowered blood pressure and the consequent dusky cyanosis so fatal in prognostic significance, are due to vasomotor paresis. The pathologists rarely describe as present any abnormality of the heart, that would lead one to suspect myocardial failure. It is not usually enlarged; it is not soft, nor does it show fatty degeneration

on section. In long continued illnesses terminating in broncho-pneumonia, it may be enlarged, but under these circumstances, it is usually the arteriosclerotic heart of the elderly or the infirm. Again sudden death is rare. It has happened only once in seven years at the Toronto General Hospital in approximately 350 or 400 patients with pneumonia. This patient, a man aged 30 years, with a long history of tuberculosis in his family, had a sudden onset with typical physical signs, and became delirious. On the seventh day he sat up rapidly, his breathing could be heard suddenly to increase in rate, his pulse became imperceptible and he fell over in bed; there were a few more jerky respirations and he died. At autopsy, no cardiac dilatation was found.

The multiplicity of drugs and the various methods of treatment by oxygen, by the administration of large doses of sodium bicarbonate to prevent acidosis, and by diathermy, is evidence that no one living in the wilderness or elsewhere has found an effective method of treating pneumonia. The effect of the toxæmia is comparable to histamine shock. What is needed, therefore, is an antidote to this histamine-like substance, which will increase blood pressure by general stimulation of all vessels, rather than by an increase in the work done by the heart. Unfortunately, such a substance is not at present known. Digitalis does lead to constriction of various vascular areas, notably the vessels of the intestinal tract. Whilst various areas are dilated, the general effect is that of vaso-constriction and hence increase of blood pressure. (Meyer and Gottlieb.)¹ If a drug is to be given, it surely is rational to suppose that it should be given till a pharmacological effect is evident. Salicylates are given in acute rheumatic fever till tinnitus or nausea is evident. Atropine is only effective when mild toxic symptoms are present. If these symptoms of mild toxicological effect are not evident, the drug cannot have reached such degree of saturation in the body that it is doing good. There is good reason to suppose digitalis acts upon the heart in infectious diseases. Cohn and Jamieson² say, "Digitalis acts during the febrile period of pneumonia. . . . and whatever beneficial effect it has on the normally beating heart, may be expected from the heart in pneumonia." Stone³ believes in the use of adequate dosage to produce

pharmacological effect. But the drug takes time to act. It must therefore be given early to prevent, rather than to cure cardiac insufficiency and vasomotor paresis. It seems advisable to give it as a routine in all cases as soon as the diagnosis is made. Certainly it can do no harm: there seems reason to believe it may be of great benefit. One of the difficulties met with in administering digitalis is the fact that the official dose is absurdly low. The dose experience has shown to be effective in heart disease is 15 c.c. of the B. P. tincture per 100 pounds body weight, or 15 grains per 100 pounds. This means that within twenty-four hours the patient should receive at least four drachms of the B.P. tincture and it should be a good tincture, or the equivalent in dried leaves from a reliable source. Christian⁴ says he has never in his practice among patients suffering from heart disease, seen one who had had too much digitalis. We have seen several patients with pneumonia exhibit partial heart block and at least two, total block. Burrage and White⁵ have recently published a report on patients suffering from pneumonia treated with digitalis in which they found a mortality among those adequately treated of only five as against eight in those not receiving digitalis. The following two case histories are significant:

P. F., 19 years of age, was admitted in January, 1920, with a typical history of abrupt onset, pain in the side and high fever. For five days he was at home, then after the administration of thirteen doses of 30 minims each of a reliable tincture of digitalis, he developed a complete block on the tenth day of his illness and his pulse rate remained low for six more days.

H. W., 30 years old had a similar history but the pain was more severe. Pneumococcus II was recovered from blood and sputum. Six days after admission, having had ten doses each of 30 minims tincture of digitalis, he developed a complete block that lasted three days only. Following the period of normal temperature, his fever returned and 100 c.c. of fluid was removed from the right pleural sac which was treated with formalin in glycerine. He then made an uninterrupted recovery.

These two healthy young Chinese were attended at least five days by their compatriots before admission to the hospital, during which time they were given native drugs. One of these is dried frog skin containing a strophanthin-like body. These were the only two patients to exhibit complete heart block in two years but they were two out of four Chinese admitted to the wards with pneumonia. This is surely evidence

that an overdose of digitalis does no harm. They had normal convalescence; their pulse rates reacted to walking in a normal manner.

These patients had a return of fever after a normal or nearly normal period. That, or the symptom of severe chest pain at any stage, should cause the physician to be on the lookout for empyema. In the final stage, the diagnosis is best made by an aspirating needle with preliminary anaesthetization of the skin. It is better to aspirate and find no fluid rather than to wait till one is sure. The fluid is infected, it grows in volume and probably in virulence—it is an abscess. If the volume of the abscess is kept small, there is much more probability of curing it by sterilization in situ by formalin and glycerin or gentian violet solution than if it is allowed to enlarge. A physician who aspirates ten times and finds pus once is better than he who does so nine times in ten punctures.

Alcohol is best used when not given. It lowers the blood pressure. If a man is already alcoholic, an acute illness is not a suitable time to deprive him; he needs the rapidly oxidizable food to which he has been accustomed; but if not alcoholic, why give the one drug that is notorious for doing what we fear may happen—lowering blood pressure.

Distension is best treated by a diet containing an adequate protein ration. The modern typhoid fever diet is ideal: soft cooked eggs, scraped beef, jellies, junkets and custards may all be given at two hour intervals. The protein does undoubtedly, in its digestion, impede the production of gas from carbohydrate surplus.

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EWING'S SARCOMA

A REPORT OF A CASE

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EWING'S sarcoma has been recognized as a definite clinical and pathological entity for but comparatively few years. Although it is not a rare disease, representing about 7 per cent of all cases of bone sarcoma, the recorded cases are still comparatively few. It is with the purpose of adding to these that this case is reported.

For a full description of the tumour, Ewing's original papers, and Kolodney's very comprehensive study of the cases registered in the Bone Sarcoma Registry of the American College of Surgeons should be consulted. It is from the latter paper that the following brief summary is taken.

Ewing's sarcoma is encountered chiefly between the ages of six and fifteen, and rarely after forty. Trauma, so frequent in the history, seems to have a definite etiological significance. Pain is a constant symptom, at first periodic,

but later continuous, and often severe. Fever accompanies the attacks of pain, and some time later, often months, a tumefaction appears with signs of hyperæmia. The blood picture is not distinctive, but a point to note is that the leucocytes do not, in uncomplicated cases exceed twelve or fifteen thousand. In the late stages marked anaemia is constant. Thus in the case of a young person, trauma followed by recurring attacks of pain and fever, not accompanied by leucocytosis, should suggest Ewing's sarcoma.

The established tumour has certain distinctive major characteristics. Almost any bone in the body may be affected, but the site of predilection is the long bones. The growth spreads through the medulla and the Haversian canals, involving a wide area of the shaft and tending to expand in all directions. The

medulla fills up, and the bone dissolves. At the same time there may be a defensive reaction, particularly on the part of the periosteum, in the form of new bone. Finally the tumour may liquefy, and, grossly, resemble pus. The skin is rarely involved unless an incision be made, when the tumour is very likely to increase rapidly in size and present a fungating mass or pus-like discharge through the incision. The usual appearance is that of a greyish white soft mass, the only supporting structure of which are strands of coarse connective tissue dividing the tumour into lobules.

The type cell is small and polyhedral, with round or oval nucleus and scant clear cytoplasm. Mitoses are abundant. Tumour giant cells are not present. Uniformity of the cells is characteristic and the arrangement is that of sheets of cells without any definite formation in the various lobules. Hydropic degeneration is not infrequent and, as has been mentioned above, necrosis and liquefaction are a common occurrence. A striking feature is a complete absence of intercellular substance. Bone absorption is common. New bone, when formed, is of a reactive nature and is not produced by the tumour cells. The picture may be complicated by an admixture of blood and marrow elements. Lymphocytic infiltration may also be encountered. This is usually situated in the periphery of the tumour and may be a source of great confusion to the pathologist when sections are removed for biopsy.

Metastases occur early and practically always in bones, particularly the skull. Visceral metastases may occur but are uncommon. These secondary growths show a greater tendency than the parent tumour to regressive changes. The fact that visceral metastases are uncommon whilst skeletal metastases are extremely frequent and early, suggests that the tumours in bone are multiple and not metastatic.

The origin of the tumour is a moot point. That it is endothelial is generally accepted and it is believed to take origin from the perivascular or lymphatic endothelium.

Ewing's sarcoma is particularly affected by the action of radium and x-rays, melting away under their influence. This is an important diagnostic point as well as a valuable therapeutic measure.

E. C., a girl, aged 18, sustained an injury to the right arm in February, 1926, by falling upon it while skating. It was sore for a few days but soon improved. In a week or two she had a recurrence of the pain and thereafter had frequent attacks. Five months later the pain became continuous.

She was admitted to the Winnipeg General Hospital on July 5, 1926. The right arm was tender and movements at the elbow were painful. There was a definite firm swelling on the dorsum of the arm connected with the bone. The temperature was elevated and remained so most of the time, never staying normal for more than a day or two at a time. The x-rays showed some elevation of periosteum. On the diagnosis of osteomyelitis an incision was made and pus-like material encountered. A month later, August 10, 1926, some new bone formation appeared, (Fig. 1). On August



FIG. 1.—Roentgenogram taken six months after the onset. There is extensive involvement of the shaft. New bone is being laid down under the elevated periosteum and in the substance of the tumour at its upper and lower ends.



FIG. 2.—There is a fusiform swelling of the upper arm most marked at its mid point. The swelling in the forearm is due to edema.

12th, a section of tumour was removed for biopsy and the pathologist reported inflammatory tissue or sarcoma, probably the latter. Following the operation the tumour increased rapidly in size (Fig. 2) and there was a profuse discharge from the wounds. The tumour was radiated at this time. Her general condition was bad and she began to have some pain over the sternum. Later, however, she improved and left the hospital September 1, 1926. The arm was still swollen and she was still running a temperature.

She was re-admitted on October 26, 1926. The right arm was much smaller but she was complaining of pain in back, left shoulder and over left iliac crest. At the latter site there was a soft, red, tender swelling behind the posterior superior spine. The x-ray picture did not show any bony lesion. This swelling was incised on November 6th. There was profuse hæmorrhage and free discharge of pus-like material, a smear of which showed small mononuclear cells, but no pus. An eroded area of the ileum could be felt through the incision and on December 15, 1926, the x-ray showed considerable absorption of bone. She lost ground steadily. Temperature was elevated, she was vomiting, pains were constant and on December 9th right-sided paralysis, choked discs, nystagmus and impaired hearing was recorded. The neurologist reported the condition probably due to metastases in the brain stem, more to the right side than the left. A large soft tumour developed over the right cranial vault. Her condition gradually grew worse and she died on February 19, 1927, approximately one year after the injury to the right arm.

NECROPSY (SUMMARY)

The body was extremely wasted. Both feet were œdematous. The thorax and abdomen did not reveal anything of importance. There were no signs of growths in the viscera. The right arm was enormously enlarged, the swelling involving also the proximal end of the forearm. This swelling felt moderately firm but not at all hard. When the arm was opened, all the soft tissues were found to be œdematous, and infiltrated with what appeared to be a malignant growth. This was extremely soft and of a whitish colour and quite homogeneous in appearance. It resembled in consistency the brain of an infant. In places it was breaking down with liquefaction, and in some places hæmorrhage had occurred. When the humerus was sawn through the tumour was found to occupy the whole shaft. The medullary cavity was involved but the bulk of the tumour was external to the bone. The bony shell was intact, but in places was quite soft. There was some ossification in the tumour in proximity to the shaft. (Fig. 3).

The spine showed a swelling to the right and anterior to the upper thoracic vertebrae. It was soft and cystic and when punctured discharged creamy

pus-like material. The vertebral discs were intact, but the bodies of two vertebrae were considerably softened. Two similar swellings were present on the ribs.

In the upper part of the sternum there were two small necrotic lesions which were taken to be degenerating tumours, and were not further investigated. Attached to the inner surface of the left iliac bone was a soft white mass the size of a plum similar in appearance to the tumour of the arm. This was found to communicate with the bone, the surface of which was markedly eroded.

On the right side of the cranial vault there was a soft mass similar to those found elsewhere. When the skull cap was removed there was found on the inner surface, corresponding to the area of the tumour on the outside, a great formation of small bony spicules. The surface of the dura in contact with this area was markedly thickened, roughened and reddened. The inner surface was smooth and pale and not adherent to the brain. There was no tumour in the base of the skull. A careful examination of the brain did not reveal any tumours.

MICROSCOPIC EXAMINATION

Sections of all the tumours presented very much the same appearance. Strands of connective tissue divided the tumour into irregular lobules which contained sheets of small cells (Fig. 4). These cells were small and polyhedral, with round or oval nuclei which were

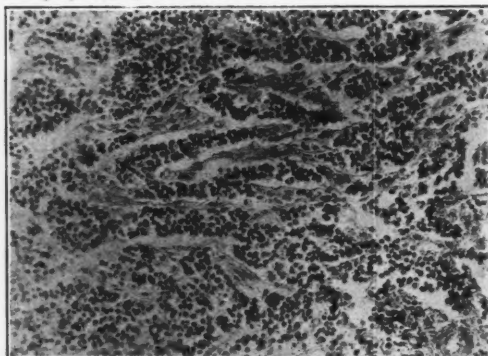


FIG. 4.—Microphotograph of tumour (x 160).—Strands of connective tissue divide the tumour into irregular lobules which are filled with sheets of small polyhedral cells, with round or oval nuclei and no intercellular stroma.

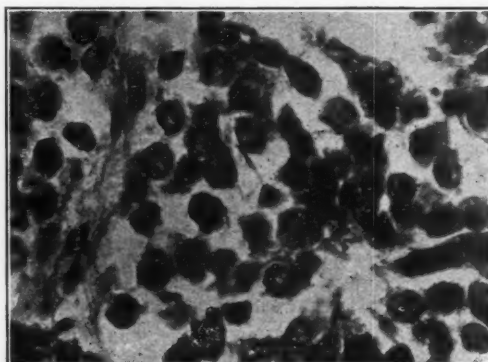


FIG. 5.—Microphotograph of tumour (x 1000).—The cells are small and polyhedral, with round or oval hyperchromatic nuclei. The cytoplasm is scanty. There is no intercellular stroma and there are no giant cells.



FIG. 3.—The tumour surrounds the whole shaft of the humerus, there is extensive diffuse involvement of the medulla and rarefaction of the cortex in places. The dark areas are the sites of hæmorrhages.

hyperchromatic, and many showed mitotic figures. The cytoplasm was scanty and stained lightly. There was no intercellular stroma. In places the cells had fused into a syncytium, some of which resembled giant cells, but no definite tumour giant cells could be found (Fig. 5). Some of the sections showed areas of necrosis.

The vertebra and shaft of the humerus showed very extensive absorption around the Haversian canals, presenting a laciform appearance, the interstices of which were filled with tumour cells.

SUMMARY

The case may be summarized as follows: a girl of 18 received an injury to the arm. This was followed by repeated attacks of pain accompanied by temperature and the development of a swelling at the site of injury. The pain and fever became constant and continued for months. The roentgenogram showed diffuse widespread involvement of the shaft of the humerus, as well as lesions in the ilium and skull. Autopsy showed many soft greyish tumours in various

parts of the skeleton, composed of irregular lobules, filled with sheets of small polyhedral cells with round or oval nuclei, scanty cytoplasm and no intercellular stroma. The entire picture, clinical, radiological and pathological is, therefore, characteristic of the conditions known as Ewing's sarcoma.

I wish to express my thanks to Dr. W. A. Gardner of the surgical staff of the Winnipeg General Hospital for permission to use his clinical data of this case, and to Professor Wm. Boyd of the University of Manitoba under whose supervision the pathological examinations were made and who kindly assisted in the preparation of this report.

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COURSE AND PROGNOSIS OF DIABETES MELLITUS IN CHILDREN*

BY GLADYS L. BOYD, M.D.

Toronto

THE observations made in this paper are the result of the study of ninety-five cases of diabetes mellitus under fifteen years of age, treated in the Hospital for Sick Children, between October, 1918, and May, 1927. The severity of the type of case treated is indicated by the following facts. Only 15 per cent of these children were able to take an adequate diet without insulin, and in none of these did the initial tolerance exceed 100 grammes of carbohydrate daily. Three-fourths of the remaining 85 per cent could not be kept aglycosuric on their basal diets without insulin. Further, thirty-seven patients, or 38 per cent of the entire number had coma, most frequently

before the beginning of treatment, but six patients became comatose on several occasions after the institution of treatment because of dietary excesses.

The expectation of life for the diabetic child has already been materially increased by insulin. Prior to its discovery, unless the disease was exceptionally mild, according to Joslin,¹ the diabetic child lived only 2.4 years. Maintenance of life for this brief period was obtained only by undernutrition, often to the point of starvation, so that many of these children might better be said to have existed rather than lived. In the present series, fourteen children have already lived 4 to 4½ years, and twenty-nine have outlived the 2½ years previously allotted to them. Two of the thirty-one were sufficiently mild that the aid of insulin was unnecessary, but it alone has made life possible in the other twenty-six. Moreover, as a result of a well-balanced diet, proper rest and exercise, these

* From the Laboratories of the Sub-Department of Pediatrics, University of Toronto and the Wards and Laboratories of the Hospital for Sick Children, Toronto.

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children are in better general health than at the beginning of treatment, and often present the general appearance of the healthiest in their respective families.

Without insulin it was practically impossible to make any severely diabetic child gain weight and hold it. Further, a more marked effect of undernutrition on height was noted than in normal children in which skeletal growth often proceeds in spite of undernutrition. The readiness with which excessive gains in weight in diabetes can now be produced by over feeding plus insulin constitutes one of the dangers of the latter, the obese diabetic being a very poor risk. An initial rapid gain in weight occurs in most children, particularly if underweight, during the first six to eight weeks of treatment. At this time the tissues are flabby, and the face often appears puffy, although no demonstrable oedema is present. After several weeks the weight curve becomes more or less a plateau, and little further gain in weight is made for some time. During this period of flattened weight curve, the earlier gains become consolidated. The puffiness disappears from the face and the tissues become firm. Thereafter the weight curve depends on the treatment, particularly the diet. Joslin found the insulin treated diabetic child gained more rapidly than the normal child for eighteen months of treatment in each of the five year periods. As already mentioned, excessive gains occurred in the first few months, but on diets containing twice the basal requirement of the child for its age; the rate of gain did not usually exceed the normal until the twelve to fifteen year old period was reached. The tendency of the diabetic children of this age to become obese led us to reduce their caloric intake to $1\frac{3}{4}$ times and later to $1\frac{1}{2}$ times their basal need. In sixteen of twenty of our insulin treated cases whose history was followed three years or more, normal weight was attained at the end of the first year and maintained at, or about that level since. Three others, on similar diets remain constantly a little below normal for their age. The fourth child tends to become obese even on restricted calories, and the overweight has an adverse effect on his carbohydrate tolerance.

Gains in height are less marked than those in weight. Joslin states that it is distinctly less

than normal. The height of the diabetic child deviates from the normal in direct proportion to the duration of the disease before treatment is started. In our cases those in which the disease had been present one month or less were all normal or over-height for their weight and age. The more chronic cases have ranged from 2.3-12 per cent under normal for their age, to a less extent for their weight, as some degree of undernutrition was usually present. In the under-height group ten (of fifteen) had attained normal height at the end of a year. At the end of two years, all but two patients were normal height for their age and weight, and have continued to gain stature at about the normal rate. The two children who have failed to attain to the standard height after 4 years' treatment are both of a short stocky race, and compare well with the other members of their families.

Insulin itself apparently exerts some stimulating effect on growth. Six patients treated in the same manner as these mentioned above, except that they were mild enough to require insulin, remain at the end of three to four years constantly a little below the normal in both height and weight for their age, particularly the latter.

Fidelity to treatment and adequate control of the disease do not play the important rôle in governing the rate of growth that would be expected. Some patients who have a progressive diabetes, because of infidelity to treatment, and more or less constant glycosuria have yet grown well and present the appearance of general well being.

Sexual development appears to be normal. It is delayed if the onset of diabetes occurs about the age of puberty, but is little affected in this respect when control of the disease has antedated this period by a few years. Breaks in tolerance, particularly if associated with acidosis, cause irregularity of the menstrual period, or even a temporary suppression of the menses.

The question of paramount importance to diabetic children and their parents is, can a cure or even a partial one be produced? It has been known for some few years that the progressiveness of diabetes could be arrested by any treatment which adequately controlled the blood sugar. Diverse opinions have been

expressed by different observers on the possibility of insulin producing a partial functional recovery. The disparity in the findings is due, we believe, to the difference in the age groups studied, and in the criterion of adequate control the observer uses. Measurements of improved pancreatic function are usually based on changes in the amounts of insulin needed to keep the patient aglycosuric on certain fixed diets, or the number of units required for definite amounts of carbohydrate in the diet. Harrison² of London reports a careful study of five selected cases of diabetes and concludes

there is no evidence of pancreatic regeneration. His patients, however, were all adults, not constantly aglycosuric and had blood sugars of over 140 mg. per 100 c.c. of plasma on several occasions. Joslin states that 40 per cent of his selected cases have either not increased their insulin requirement or have decreased it. Hartman³ of the St. Louis Children's Hospital, reports that six out of twenty-seven patients studied, or all who remained aglycosuric, have gained in their tolerance for carbohydrate.

In Table I are given the yearly gains or losses of tolerance in thirty-seven of our

TABLE I

Yearly changes in insulin requirement. (Measured as units of insulin required for each 10 gms. of available carbohydrate in the diet to keep the patient sugar free and his blood sugar normal).

Age of patient at beginning of treatment	1923	1924	1925	1926	1927	
(a)—Patients who are adequately controlled practically all the time.						
MN.....	14	—	.51	.32	0	0 sugar free on 200 gms. carbo. daily
WN.....	8	6.9	2.6	killed in an accident		
DG.....	7	2.6	1.5	1.2	.8	2.06 rise due to masked antrum infection
MB.....	8	2.6	—	1.9	1.8	1.8
SA.....	8	1.3	.53	.68	.68	.8 high renal threshold for glucose hyperglycemia
AG.....	12	—	2.9	1.2	1.4	1.5
GA.....	11	—	.42	.39	.3	.3
TB.....	6	—	.51	.72	.64	.24
FM.....	8	—	—	4.2	2.09	6.0 rise due to badly treated infections
ED.....	10	—	—	—	2.2	2.1
EL.....	9	—	—	—	2.2	3.0
MB.....	10	—	—	—	1.9	1.9
(b)—Patients who are kept well under control part of time but have frequent breaks in tolerance.						
DR.....	11	4.5	—	3.8	4.0	3.9
DH.....	10	1.7	1.5	1.4	1.2	1.2
GM.....	2	—	4.2	2.8	3.7	3.7
NA.....	11	—	4.9	4.9	4.1	5.0
EP.....	14	—	—	—	4.7	4.7
ES.....	9	3.8	3.5	4.1	4.1	4.2
EA.....	4½	1.1	—	—	3.1	3.4
PB.....	6	—	0	5.0	1.8	3.9
RM.....	9	—	1.7	2.5	3.4	4.3
JW.....	5½	—	—	.72	.51	2.2
(c)—Patients with frequent mild glycosuria (small amounts sugar in some specimens of urine each day).						
EN.....	11	2.6	—	—	1.3	?
MMcD.....	5	5.5	—	3.05	3.1	?
SM.....	7	—	—	3.3	2.4	3.0
AM.....	12	—	—	—	2.7	2.5
SH.....	6	0	.8	4.2	1.8	2.4
WD.....	8	—	—	.1	—	2.4
NW.....	3	—	—	—	2.5	4.2
CL.....	11	—	1.6	4.5	3.3	3.9
LP.....	11	—	3.0	3.3	3.3	3.4
JR.....	8	.66	1.0	2.0	2.4	?
JD.....	2	2.5	2.9	died in coma	—	—
LP.....	4	2.6	—	4.5	died in coma	—
(d)—Patients under no control in which glycosuria is practically constant and attacks of acidosis or even coma frequent.						
BL.....	7	0	.15	—	—	— takes 60 units insulin daily—Bl. sugar ranges .2-.35%
MW.....	11	—	1.7	2.5	3.4	4.3
FZ.....	6	0	1.0	—	—	— takes 60 units a day—Bl. sugar ranges .3-.45%

patients who have been under treatment for two or more years in which such data could be obtained. (See Table I).

As indicated, the tolerance was measured by the number of units of insulin required to metabolize each 10 grammes of available carbohydrate in the diet. The caloric intake was the same per age in all cases, *viz.*, twice the basal need in those under twelve; after this age one and three quarter times this amount.

In Group A, the reward of the faithful is obvious. Nine of the twelve have made steady gains in tolerance. One, D.G., improved rapidly until about eight months ago, when his insulin requirement began to rise. Two months ago a chronic sinusitis was diagnosed and since the washing out of both antra, he has made steady progress again. F.M. gained steadily until a series of badly handled infections this winter broke his tolerance. His resistance to insulin since that time suggests an undiscovered focal infection. The third child, A.G., whose insulin need has ceased to fall, only requires half as much insulin as when treatment was started four years ago. He just reached the age of puberty a year ago and in spite of reductions in his caloric intake tended to become obese. His overweight evidently had an adverse effect on his tolerance, and with weight reduction this last few months, he requires less insulin.

In Group B are ten patients who remain aglycosuric part of the time, but due either to dietary excesses, or infections, have more or less frequent periods of broken tolerance and acidosis. Improvement in this series is dependant on the relative length of the controlled and uncontrolled periods. Six patients show either no gain, or decrease in tolerance. They are those in which breaks occur so frequently that they have become almost chronic. In the others, long enough periods of fidelity to treatment are interspersed with the breaks to permit an improvement.

The ill effects of mild glycosuria are shown in Group C. Some of this group have purposely allowed slight glycosuria with the erroneous idea that reactions at night would be avoided thereby. Others are patients difficult to keep aglycosuric except in hospital, but the sugar in small amount is present in one or two specimens every few days. Three of the four gained, but practically all the gain was made early in the course of

treatment, while the occurrence of glycosuria still alarmed the parents and resulted in the early eradication of the cause. The relative increase in the amount of insulin required has been greater than in Group B.

In Group D, are those patients who are almost constantly glycosuric. In all the tolerance has been much reduced. They take large amounts of insulin daily, but insufficient to control their disease. All of them have grown well and appear strong and well. Their prognosis, should they suffer from a severe infection, would be extremely bad.

The difference in progress of these patients is not due to any inherent difference in the disease process but to differences in the degree of control maintained. No patient in the whole series, unless it be F.M. mentioned before, has failed to gain tolerance during periods of control such as a stay in hospital. This ability to improve persists even after prolonged retrograde progress. It will be noted in the table that the first year often marks the most marked improvement in tolerance. Decreases in the insulin dosage are more striking in this period but we believe do not wholly account for the gains in the first year. Sugar in the urine at first alarms parents, later they become careless because they fail to appreciate the fact that while their child appears well the disease process will be progressive if glycosuria is frequent.

Pathological evidence possibly furnishes further proof of regeneration of the pancreas. We⁴ presented one such case to this Society a few years ago. Warren and Root⁵ have since published a report of similar cases. We have had one other pancreas from an insulin treated case which presented a similar picture to that of our published case. We fully appreciate the difficulty of interpreting these pathological findings in view of their scarcity and newness. It is a fact, however, that such findings have all been in insulin treated cases and are very different from the usual findings in the pancreas of diabetic children. Further, in one of our cases of progressive diabetes who was never under control except while in the hospital, no such changes were found, but the pancreas resembled that of an untreated case. To view such changes as the reported ones as regenerative is not only the most desirable, but also the most plausible explanation of the findings.

PROGNOSIS

The most important factor in the prognosis of diabetes in children is the co-operation that can be secured from parent and child in controlling the disease. Improvement in the diabetic condition, and progression at least towards a cure is the unfailing reward of adequate control of the disease. One such child, (M.N. in the table) a sister of the child reported as showing pancreatic regeneration, has never had glycosuria in nearly four years. Her reward was ability to discontinue insulin two years ago and gradual increases in her diet since until six months ago when it contained nearly 250 grammes of carbohydrate daily, she stopped weighed diets, restricting it only to approximately that level. Glycosuria has not occurred and frequent blood sugar tests are normal. Another child (F.Z. in Table B) became diabetic about the same time, but was mild enough to require no insulin on full diet. The day after discharge she started her downward career by eating a large amount of candy. She soon needed insulin, and her carbohydrate tolerance since has had wide fluctuations, depending on the degree of control maintained. Her insulin requirement at present is big enough to demand that she be classed as severely diabetic. These two cases furnish a well marked illustration of the all important effect of the care the child receives.

Laboratory tests are not of much value in making any statements excepting those of the immediate progress. The height of the blood sugar before treatment is no indication of the severity of the case. High blood fat, particularly, if associated with hypercholesterinemia indicates the presence of serious disease.

Etiology does not play any striking rôle in determining the prognosis. Cases of hereditary or familial nature often appear milder, but we believe that the earlier diagnosis usually made in these cases is responsible for their apparent mildness.

The age of the child affects the outlook somewhat. Generally speaking, the younger the child the more acute the disease, and the more difficult it is to establish control. In this way young children do worse than older ones. On the other hand, improvement in tolerance and pathological evidence of regeneration are more marked the younger the child, provided control can be established and maintained.

Infections always cause a temporary depression of carbohydrate tolerance. If properly handled by dietary restrictions and increased insulin these are only transitory. Influenzal infections appear more resistant to insulin than do others, and patients with this type of infection often require large quantities of insulin even on a restricted diet. Four patients in this series are complicated by having mediastinal tuberculosis. With adequate rest for this infection all have done well. Rises in insulin requirement and frequent glycosuria in a previously well cared for child suggest focal infection, which may only be discovered after careful search. Eradication of sinus infections by washing out the sinuses has resulted in prompt improvement in two patients.

Obesity in a treated case alters the prognosis for the worse in two ways. In aglycosuric cases it increases the need of insulin and should acidosis or coma develop it makes recovery far more doubtful. Only one child of our series has been obese before treatment, but in her the disease was mild in type and readily controlled by diet alone after some reduction in her weight.

Coma was a complication, frequently the mode of onset, in over a third of our cases, so that a word as to the prognosis justified in these cases might not be amiss.

TABLE II
MORTALITY OF DIABETIC COMA IN THE HOSPITAL FOR
SICK CHILDREN, TORONTO.

	Oct.-Oct. 1918 1922	Oct.-Oct. 1922 1924	Oct.-Apr. 1924 1927	Oct.-Apr. 1922 1927
Number of cases . . .	5	15	31	45
Number died . . .	5	5	8	13
Percentage of mortality	100	33.3	25.9	8.82

In Table II are given the incidence and mortality of coma cases admitted to this hospital between October, 1918, and May, 1927. Cases of severe acidosis in which the patient was able at the onset to take fluids by mouth are not included. Their addition would reduce the mortality to 23.6 per cent instead of 28.8 per cent.

The improvement in mortality rate since 1922 may be due in part to better treatment, but we

believe the earlier admission to hospital has been largely responsible for the reduction.

Table III shows the effect of delay in coming for treatment on the mortality rate, and Table IV shows the earlier admissions made in more recent years. During the past year no patient, has been admitted more than forty-eight hours after the onset of coma, and the mortality has been only 20 per cent.

TABLE III
EFFECT OF DELAY IN INSTITUTING TREATMENT ON
MORTALITY RATE IN DIABETIC COMA

Time elapsing between onset and starting treatment	Number of cases	Number of deaths	Mortality percentage
0-24 hours	27	4	14.8
24-48 "	9	3	33.0
48-96 "	4	2	50.0
96 "	5	4	80.0

TABLE IV
TIME AFTER ONSET OF COMA, TREATMENT WAS STARTED

	Oct. 1922—	Oct. 1924	Oct. 1924—	Apr. 1926	Apr. 1926	Apr. 1927
	No. of cases	per- centage of total	No. of cases	per- centage of total	No. of cases	per- centage of total
12 hrs. or less	4	25.0	8	38.0	4	40.0
12-24 hours	1	6.9	5	23.0	3	30.0
24-48 "	2	1.33	3	14.0	2	20.0
48-96 "	2	1.33	4	10.0	1	10.0
90 "	6	40.0	1	4.8	0	0

Hospital Charity.—An unusually efficient survey of the manner in which modern medical practice is attempting to meet the needs of the community is available in a preliminary report of a committee appointed by the Michigan State Medical Society to investigate the charity work of Michigan hospitals. The committee finds that the distribution of costs of hospital service is not equable, since patients with more expensive accommodations are forced to pay the way to a considerable extent of those in the wards or cheaper rooms. "The relative proportion of wards and rooms is rarely adjusted," it is said, "to meet the pocketbook, and patients are frequently forced into rooms that are beyond their means." Moreover, patients are charged fixed rates and not according to their means, so that a wealthy patient, to save expense, may elect to go into a ward and thus deprive some more needy patient of the opportunity to secure lower

Summary

1. The average length of life of the diabetic child has been lengthened by the use of insulin.
2. Normal growth and development occur in the treated diabetic child.
3. Diabetes in children is a rapidly progressive disease, which may not only be arrested in its course, but made less severe under adequate treatment with diet and insulin. The criterion of successful treatment consists in the absence of glycosuria and the maintenance of normal blood sugar for the greater part of the time. Fluctuations in tolerance are frequent, and gains may only be retained by fidelity to treatment.
4. Pathological examination furnishes a certain degree of evidence, favourable to the belief that pancreatic regeneration may occur.
5. The incidence of diabetic coma has not declined, but a material decrease in its mortality due first to insulin, and secondly to earlier recognition and treatment has occurred.

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priced accommodations. Among the costs assessed to patients are those associated with the maintenance of the nurses' training school, uncollected bills, outpatient departments, and charity work. The committee felt that all these charges actually belong on other shoulders. Because of the costs involved and the difficulty of meeting expenses, physicians are often asked to render free service to patients who should not actually have such service, the reason assigned being the cost of the hospital service. Here again the committee felt that physicians should not be obliged to render service without compensation in instances in which they did not feel that the patient was entitled to charitable service. The basic principle recognized was, however, that it is better to be over-generous in the donation of services than to be harsh and uncompromising to those struggling for an existence and in distress.—*J. Am. M. Ass.*, Aug. 6, 1927.

ECZEMA IN INFANTS AND YOUNG CHILDREN*

BY CHARLES GILMORE KERLEY, M.D.

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WITH the invitation to address the Canadian Medical Association on a topic connected with pædiatrics came the suggestion that I take up the subject of eczema. In accepting this topic for my address I will confine myself to my own observations and conclusions and make this communication entirely personal.

My cases of eczema divide themselves into two groups:—

Group 1.—The skin lesions in this group represent primarily the expression of a constitutional error, and the inability of an infant or young child to adjust itself to life's contacts without the production of a definite specific reaction, which manifests itself in a skin lesion; a reaction arising from a condition known as protein sensitization. The offending proteins are operative through the ingestion of protein food substances or through contact of wearing apparel or otherwise.

Group 2.—Comprises that comparatively small portion of all cases of eczema due to local skin irritants from sources always from without; operative in this group are sunburn, strong soaps, irritating applications such as turpentine and camphor, and irritating discharges from the intestines and bladder. Dermatitis thus produced is always accompanied by itching with the additional trauma from scratching and rubbing. In this condition there is invariably an associated bacterial infection. We have resulting an eczema that differs from the allergic type in that it is readily relieved by protective and sedative applications. It is in such cases that salicylic acid, carbolic acid, tar, sulphur and resorcin produce prompt results provided further trauma is eliminated through protective dressings.

Attempts at dividing the eczemas of the young into types depending upon the nature of the skin lesion is an antiquated procedure, and quite impossible when one small baby will show all

types at one time on different portions of the body.

To discuss first the most difficult cases that apply for relief as represented by the thriving breast fed baby, we require that every infant or child with eczema regardless of age should have at least two evacuations daily; in infants the nursing period should be regulated. In all cases we make the scratch skin protein tests; in some infants the dermatitis is so intense and general and of such a severe degree, that this test cannot be carried out; in these cases we remove from the patient's environment all agencies to which eczematous infants are found most frequently to be sensitized, such as silk, wool, hair, feathers and toilet powder containing orris root. The mother's diet should be investigated; eczematous babies frequently react to cows' milk; nursing mothers are apt to drink large quantities of cows' milk, and we have improved several cases of eczema in infants by eliminating entirely or largely cows' milk from the mother's diet. A six months' old infant developed red flaming cheeks when the mother's daily intake was in excess of eight ounces. Many mothers of the poorer class drink a great deal of strong tea; we have relieved but not cured many eczematous infants by stopping the mothers' tea drinking. This observation was first made many years ago at the outpatient department of the Babies Hospital. If eggs form a frequent article of consumption by the mother, the eggs are discontinued. Talbot reported a few years ago the case of an infant in whom its eczema was greatly relieved by removing chocolate from the mother's diet, with a return of the eczema when the chocolate eating was resumed. Hutinel and others have reported cases of sensitization transmitted through human milk to nursing infants.

When the condition of the skin permits

* Read before the Canadian Medical Association, Toronto, Jan. 15, 1927.

carrying out of the protein test and when the reaction is positive, the offending protein should be removed; the environmental management should demand the same for all fabrics that might possibly maintain irritation.

Should the breast feeding be discontinued on account of eczema? Not if the infant is thriving satisfactorily. We should attempt through local measures to keep the patient as comfortable as possible, and endeavour to impress the mother with the fact that personal appearance is of little importance to a baby and that proper growth and development is the first consideration.

In bottle fed cases, in whom the skin tests cannot be made because of the intense general dermatitis, the same methods as regards externals are employed. Silk, wool, feathers, hair and orris root are to be discarded. If the case permits, which means that if there is a sufficient amount of skin surface uninvolved, the scratch tests should be made, about sixty in all. Positive reactions demand an elimination of all responsible protein or proteins with the exception of cow's milk. Assuming that the child fails to react—and we have such cases—we again supply an environment free from wool, silk, feathers and hair; we omit all wheat products from the diet, because of the frequent sensitization to wheat proteins, and we direct all food substances such as milk and any cereal employed should be subjected to prolonged boiling. Milk should be boiled from three to six hours. Why? Because we have found that the responsible protein factor operative, though impossible of demonstration by the skin tests, is made less active or destroyed by prolonged heating. Milk is a frequent offender, and a bottle baby may not be properly nourished without milk, and we dare not allow the baby to lose weight.

The skin tests both the scratch and the intradermal are at best crude tests for protein sensitization. Clinically we have repeatedly found that a given protein will produce eczema, although it fails to produce the skin response. Research in the laboratory has done much in the past to explain the how and why of many established clinical facts known for years. The prolonged heating of the milk chemically or otherwise makes a change in the offending protein element and destroys or weakens it.

A case in point was seen with Dr. Roger Dennett of New York City. A nine months old child had for six months suffered from an acute intense general eczema; the child was on a skimmed milk and barley diet, skin tests were impossible; the cows' milk formula for the food was being cooked five minutes. At my suggestion the formula was boiled for six hours with no other change in treatment. A letter received from Dr. Dennett about four weeks later is as follows: "The child was put on a test diet consisting of cereals, breadstuffs, stewed fruit and skimmed milk boiled five minutes. After five days the skin became worse with intense itching over the entire body. Seen in consultation by Dr. Kerl y, the only change in the treatment recommended was to boil the skimmed milk for six hours and to cook the cereals in the milk. In four days the skin was much better; so the treatment was continued. In nine days the skin was practically clear: there was no itching whatever. Weight 19 pounds 3 ounces; a gain of one pound in eighteen days." Dr. Dennett closes as follows: "The remarkable change that took place after the milk was boiled with the cereal for six hours can be attributed to nothing else than the prolonged boiling of the milk as the local treatment was negligible at all times."

Marasmic infants will often do better on evaporated milk which is also subjected to prolonged boiling. An objection to its use is the presence of fat which is not tolerated by many eczematous babies.

Particularly troublesome are the cases that react positively to several necessary food substances. A diet, we will assume, is selected of non-reacting foods; the child improves satisfactorily, and perhaps, is well for a month, or more, when the eczema returns in full force; and the infant will be found sensitized to every protein he is taking, and negative to those which showed prompt response a few months before. In such ready reactors it will be necessary to frequently change the food formul e, and in each change to be guided by the skin reactions. It is also not only necessary to check up the causative agent, but to be on guard against the secondary dermatitis which will be continued indefinitely if trauma through rubbing and scratching is permitted. If trauma

is prevented suitable applications of sterile oil, or salicylic acid, carbolic acid or tar will do the rest. To prevent the rubbing and scratching is difficult, a mask for the face, the straight-jacket, splints for the arms or arm-holders all may have to be used; local applications should be spread on linen and bound to the special parts by bandages. For seborrhea of the scalp 1 to 2 per cent of resorcin in vaseline applied on linen and kept in place by a cap has given me most satisfactory results. If the scalp dermatitis is severe, and associated with weeping, it is best to use sterilized oil as a dressing at first.

Infants with eczema and those with sensitive skins suffer much from so-called intertrigo—the familiar red inflamed groin and buttocks. For such cases, I reduce the fat content in the milk and add 20 grains of sodium bicarbonate to the day's formula, the napkins are boiled, and when dry are dipped in a saturated solution of boracic acid and again dried, while on the parts affected is applied the official ointment of zinc oxide to which 10 per cent of white wax should be incorporated. Another useful measure is to expose the parts uncovered to the air several hours a day.

The part played by fat and sugar in infantile eczema is difficult of explanation. Clinically, 'cows' milk fat and cane sugar play a certain part; for example, an infant fed on a formula containing super-boiled skimmed milk clears up the eczema; if given whole boiled milk in the formula the eczema probably returns. If given unboiled skimmed milk no impression is made on the skin lesion. Sugar acts somewhat after the same fashion, and only a low sugar content is permissible in the formula of an eczematous baby. My theory is that the presence of fat and sugar in the diet, in some way protects or re-establishes the irritant protein element. I am confident that some clever laboratory worker some day will explain why!

For eczema in runabouts and older children skin tests should be made. The proteins to which the child reacts, I remove from the environment and diet, and whether or no the child reacts to them, all nitrogenous animal foods are temporarily removed from the diet with the exception of milk, and this is cooked for several hours.

I make these patients vegetarians. Many cases of infantile eczema recover spontaneously at the twelfth or fourteenth month, which appears to indicate that the child has become immunized through food or contact association. Those who do not recover at this time, I find are remotely sensitized to animal food substances and occasionally to fabrics.

In December of last year a three year old, otherwise well, boy was brought to me suffering from an intense dermatitis: there had never been any asthma, or frequent colds, or skin lesions prior to three months previous to this visit. He had been under constant observation and treatment by a dermatologist during this period. In seeking a cause for the trouble, I asked the mother how long he had been wearing silk and wool underwear. She stated that he had always worn wool and cotton, but that about three months ago an aunt had presented the boy with a very fine outfit of silk and wool underwear, which had since been worn. The boy was given the scratch skin silk protein test and reacted in a wheal as large as a half dollar. He was otherwise negative to protein tests. My prescription was linen mesh underwear and an application of sterile olive oil to the skin. In ten days the skin was clear and there has been no return of the trouble in six months. The majority of the older children, however, those who show no skin reaction, respond to the removal of flesh foods and eggs from the diet. Our cases in older children are usually chronic in nature; the most frequent sites are the flexure surfaces at the elbows and knees and the outer surface of the legs, and they have an associated low type staphylococcus infection, and sometimes a furunculosis; there is always more or less hypertrophy of the skin due to habitual scratching and rubbing, and here again local applications are of much service; ointments containing salicylic acid, or carbolic acid and tar in suitable strength afford protection to the parts and take care of the local lesions. The frequent association of eczema and asthma has been frequently commented on by many writers, and I can only corroborate the association.

Summary

Infantile eczema represents a skin reaction to foreign protein.

A given protein or proteins may produce

eeczema and yet the skin may fail to respond to tests with these proteins.

The responsible food protein may often be rendered innocuous by subjecting it to prolonged heat.

Non-reacting animal food proteins are re-

sponsible for many of the eezemas of older children.

A case of true infantile eeczema that recovers under the treatment of local applications alone, means that the infant has become immunized to the responsible protein factor.

BURNS IN CHILDREN*

By JOHN W. S. McCULLOUGH, M.D., D.P.H.

Toronto

PROF. JOHN FRASER of Edinburgh, in a British Medical Association Lecture at Aberdeen, treats the subject of burns in children in a practical fashion. His remarks are summarized as follows:—

The immediate effect of the burn (or scald) is temporarily anæsthetic, but is soon followed by intense pain which is best controlled by morphine. There is initial shock after which, the burns being suitably dressed, the patient is comfortable and for a couple of days a favourable issue may be anticipated. But about the third day the temperature, hitherto but slightly elevated after the "shock fall", begins to rise to 101° or 102°. There is restlessness, rapid pulse and breathing, delirium and finally coma, to which before the end in a bad case, are added general cyanosis and cold extremities.

In burns of children the third day is the critical time. The cause of this is the existence of a chemical change in the burnt tissues, not an organismal decomposition, but a chemical change, which results in the production of toxic elements. The body alkalies become depleted and a condition of "acidosis" exists. The toxic products resulting from the chemical changes in the burnt tissues are thought to be similar to histamin or pyridin. The poison is particularly dangerous because of its liability to deteriorate the liver cells, the delicate cells of the kidney tubules, the adrenals, the striated heart muscle and the lymphoid tissues.

How can these untoward results be prevented?

Systemic Treatment.—(1) Shock is controlled by the application of heat, the use of stimulants, etc. If deepening, glucose saline is given subcutaneously or by rectum.

2. Pain is relieved by sedatives such as morphine.

3. The alkaline reserve of the body must be kept up by the use of alkaline sodium phosphate by mouth; 20 to 30 grs. every hour. This salt is better than sodium bicarbonate because it remains longer in the body.

4. A sugar reserve is supplied in view of the calls upon the liver glycogen. Sugar is supplied in a 5 per cent solution of glucose, and fluid in abundance by bowel and mouth.

5. Hexamine (urotropin) in solution by the bowel is said to have a fixative or corrective action upon the toxic elements and may be useful as in other septic toxæmias.

6. Exsanguination to the extent of 20 c.c. of blood for each pound of body weight followed by the transfusion of a similar amount of blood from a suitable donor.

Local Treatment.—Light general anæsthesia may be given; if clothing is adherent it should be soaked in a 10 per cent solution sodium bicarbonate. If a fixative or coagulant treatment is to be used, the blisters should be punctured and the pellicle removed; if a protective such as paraffin is chosen, the blisters are punctured and the pellicle left alone.

1. *Fixation Methods.*—(a) Absolute alcohol—especially useful about the face as it lessens scarring. It is applied constantly by means of

* *British Medical Journal*, June 18, 1927.

a gauze pack, saturated by repeated spraying, sprinkling or by capillary drains.

(b) Pieric acid in the following solution:

Pieric acid	2	drachms.
Absolute alcohol	1½	oz.
Water	to 2	pints

This should be applied as a spray or paint and covered with a thin gauze so as to allow of evaporation. In extensive burns there is danger of undue absorption and consequent poisoning.

(c) A 2 per cent solution of aluminum acetate in spirit with 5 per cent alcoholic solution of methylene blue in the proportion of 10 to 1 used as a spray and covered with gauze.

(d) Adrenalin, 1-10,000 with or without novocain (½ per cent) with, as in the case of other fixative methods, exposure to air.

(e) Tannic acid in 2.5 per cent watery solution sprayed on and covered with thin gauze, is a valuable local treatment of burns. Used about the face a 5 per cent ointment made with lanolin and vaseline in equal parts may be used. In from 14 to 20 days the tanned area separates, leaving a clean granulating surface. The use of tannic acid is a real advance in the treatment of burns, and more than any other method has reduced the mortality figure.

2. *Biochemical Method.*—(a) Alkaline bath of warm sterile water containing 10 per cent sodium bicarbonate. The child is slung in a hammock-like arrangement and the water kept at a uniform temperature. In small areas compresses

with a 10 per cent solution is soothing and efficacious.

3. *Protective Methods.*—Paraffin. The original "ambrine" or No. 7 paraffin is the best protective. Its constitution is as follows:—

Besorcin	1	pt.
Eucalyptus oil	2	pts.
Olive oil	5	pts.
Soft paraffin	25	pts.
Hard paraffin	67	pts.
This combination melts at 48° C.		

The part is brushed over with absolute alcohol, and the surface dried by hot air. The burnt area is then covered with the fluid wax, as a spray or paint, or by soaking inch strips of gauze with the mixture. The latter are laid edge to edge. Over the paraffin a thin layer of sterile cotton is applied and when the application has hardened, further layers of wax and cotton are applied. After 24 hours it will be found that the protective covering has been raised in places by serum. These are punctured with a hot metal point and evacuated. More wax is applied to close the puncture. Usually re-applications are necessary in cases of any severity.

4. *After Treatment.*—There is need to watch for the development of contraction. Much can be done by massage and the use of suitable appliances. Thiersch or pedicle grafts will usually be required and contraction minimized by massage, exercise, ionization and cautious use of the x-ray.

Diuresis Versus Antisepsis in Treatment of Urinary Infections.—Veader Leonard, Baltimore, believes that it should be emphasized that in certain instances the benefits to be derived from the administration of large quantities of fluids may be of far more importance than disinfection of the urinary tract. Under these circumstances the urinary antiseptic might just as well be discontinued until such time as the necessity for "forcing water" no longer exists. In other words, urinary infections may be treated by diuresis or they may be treated with internal urinary antiseptics. All the experimental evidence available indicates decisively that these two methods of treatment should never be combined. While the activity of methenamine, feeble at best, is reduced by diuresis, in the case of hexylresorcinol the effect is even more striking. Normal men receiving therapeutic doses of hexylresor-

cinol together with a moderate quantity of water (1,200 c.c. daily) secrete an almost continuous flow of bactericidal urine. If the quantity of water is doubled, bactericidal urine appears only intermittently, and if excessive amounts of fluids are taken, bactericidal specimens are rarely obtained. It is obvious that clinical results with hexylresorcinol could hardly be satisfactory unless diuresis is carefully avoided. Experiments and clinical observation lead to the suggestion that in chronic urinary infections which had resisted treatment with hexylresorcinol the offending organism might have developed a greatly increased sensitiveness to the action of formaldehyde, and that large doses of methenamine should be substituted. Previous failure with methenamine bears no relationship to the drug rotation suggested under these circumstances.—*J. Am. M. Ass.*, Aug. 13, 1927.

THE SPECIFIC DUTIES OF MEDICAL OFFICERS OF HEALTH IN DEALING WITH COMMUNICABLE DISEASES*

PART I—SMALLPOX, TYPHOID FEVER, DIPHTHERIA

BY JAMES ROBERTS, M.D.

Medical Officer of Health for the City of Hamilton, Ont.

THE communicable diseases with which the medical officer of health is chiefly concerned in Ontario are smallpox, typhoid fever, diphtheria, and septic sore throat, scarlet fever, measles, whooping cough, pneumonia, mumps, chickenpox, tuberculosis, with sporadic outbreaks of anterior poliomyelitis, cerebro-spinal meningitis and influenza. He is also charged with the administration of the V.D. Act.

In a general way the responsibility of the medical officer of health with respect to the control of these diseases is defined in Section 57 of the revised Public Health Act which reads as follows: "Where any communicable disease is found to exist in any municipality, the medical officer of health and local board shall use all possible care to prevent the spread of infection or contagion by such means as in their judgment is most effective for the public safety."

The specific measures undertaken by the health officer in the control of the epidemic diseases should be governed as far as possible in accordance with known knowledge, first, as to their mode of origin, and second as to the manner of their dissemination.

SMALLPOX

In order to be as brief and concise as the subject will permit, I propose to begin at once with smallpox, by reminding you of that with which you are quite familiar, the disquieting effect on the tranquillity of the health officer occasioned by the appearance of this disease in his community. The Ontario Vaccination Act requires the successful vaccination of every child born in the province within four months after the birth of the child, either by the family physician or by a legally qualified practitioner appointed by the local board of health or the

municipal council for this particular duty, and at a convenient place appointed by the municipal council, or in default of the appointment of such place, at a place appointed by the local board of health. If smallpox exists, or there is danger of an outbreak owing to inter-communication with an infected locality, it is the duty of the municipal council to order general vaccination or re-vaccination as the individual may require. The presence or threatened presence of smallpox empowers the medical officer of health to demand evidence of successful vaccination or re-vaccination, within a specified time, of all pupils or students in attendance at elementary and high schools, colleges and universities or any other private or public institution of learning within his jurisdiction. The trustees, governors or directors having control of a hospital or dispensary receiving government aid are required to keep on hand at all times a supply of smallpox vaccine, to vaccinate poor persons free of charge and such others as are able to pay, for a fee not exceeding fifty cents. A certified statement by the proper officials of such hospitals or dispensaries, showing the number of persons who have applied for and received free vaccination, also a list of those who have paid for this service and the monies received therefore and how applied is required annually by the government. Contravention of any of the requirements of the Vaccination Act incurs the penalties set forth therein. Nevertheless its provisions are more honoured by their neglect than their observance. Statistics tell us that for some years past, smallpox is on the increase in both the United States and Canada. The Metropolitan Life Insurance Co., in response to a questionnaire sent out in 1921, elicited information with regard to the prevalence of variola in 243 cities of the United States and Canada. In 140 of the cities there were

* Read before the Ontario Health Officers' Association, June, 1927.

14,335 cases of smallpox in 1919, and 154 of these cities reported in 1920, 19,104 cases of smallpox. The United States cities reported an increase from 42 to 58 per 100,000 of population in 1920. The Canadian cities showed an increase in their records from 150 to 165 per 100,000 of population between 1919 and 1920. The Surgeon General United States Public Health Service stated that for 1924, approximately one-fifth of all the cases of smallpox reported in the world during 1923-1924 occurred in the United States. Detailed studies of this disease show that its incidence bears a very definite relation to the number of unvaccinated people where areas of any considerable size and population are considered. For instance Massachusetts, with good vaccination laws, had 457 cases during 11 years. Minnesota with no laws, during the same period, had 35,153 cases.

The anti-vaccinationists aver that the so-called smallpox is not the pestilence of pre-vaccination days at all, and is scarcely worthy of serious consideration. Their contentions assume an almost ludicrous turn in face of the fact that the first case in the Windsor epidemic was one of the hemorrhagic type and the Duluth outbreak in February, 1924, began with the same type. The Detroit outbreak in 1924 showed that while those exposed to discrete smallpox usually contract the disease in this form, a number of the secondary cases may be either confluent or hemorrhagic.

In my opinion, the Windsor, Detroit and Duluth epidemics have done much to discredit the propaganda of those opposed to vaccination in this country, and to expose the ignorance and fanaticism of their campaign. Every health officer knows that vaccination protects against smallpox. He knows as a matter of experience that the people among whom it is seldom found are doctors and nurses, usually well vaccinated, and immigrants from foreign countries where vaccination is compulsory and systematically carried out. He knows that when asked over the telephone by a fellow physician to see a suspicious smallpox rash, that invariably the first question he asks that physician about his patient is, "has he a vaccination scar?" If the answer is yes, he makes a provisional diagnosis of chickenpox always before seeing the patient.

What is the most successful, as well as practical, method for the control of this disease

under present conditions? Vaccination by compulsion alone, quarantine and isolation alone, or a combination of optional vaccination with quarantine and isolation?

At a public health meeting over which I once had the honour of presiding, Dr. Herbert Sinclair, of Walkerton, said: "Owing to the ideas of personal liberty prevailing in Ontario, it would be as easy to enforce compulsory circumcision or infant baptism as compulsory vaccination (though you can enforce a law to make it a crime to buy a stamp, a newspaper or an ice cream soda on Sunday.)" and there is much to the point in his remarks.

In the presence of outbreaks of such fearful virulence as occurred in Windsor, Detroit and Duluth, health officers need not worry about the enforcement of vaccination. Their greatest concern in such situations would appear to be the provision of facilities for carrying out the procedure on a scale sufficiently large to satisfy the public demand.

Perhaps the most important point in the control of the outbreaks of mild smallpox which have occurred so frequently in recent years in Ontario is the prompt recognition of the first cases. The incorrect diagnosis of these on the part of the attending physician puts the health officials of the community at a serious disadvantage, inasmuch as they may find themselves confronted with a considerable number of secondary cases, many of them so mild and hard to recognize that the disease becomes difficult to control. On the first appearance of such an outbreak, it is the duty of the health officer to insist that all cases, including those of a suspicious nature shall be promptly reported. Nurses and sanitary inspectors in the course of their routine work and house to house visiting, should constantly be on the lookout for mild and missed cases, some of which may not have had the attendance of a physician. Isolation in a suitably equipped hospital is desirable in this disease, especially for the more severe cases. All contacts should be quarantined for the period of incubation unless satisfactory evidence of recent successful vaccination or of immunity to the vaccine disease is obtainable. As vaccination and mild smallpox not infrequently run concurrently there should be frequent observation of all vaccinated contacts during the incubation period.

All articles of clothing, bedding, and other materials surrounding the patient should be boiled and there should be an effective cleaning and disinfection at the termination of the illness.

The health officer should encourage by every educational means available, the vaccination of infants and young children, the vaccination or re-vaccination as the child may require of all school children, and, particularly where an outbreak assumes a severe or malignant type the immunization by this means of the adult members of the community.

TYPHOID FEVER

There is no field of public health activity where the trained epidemiologist has a better opportunity for the display of his resourcefulness and capability than in the control of typhoid fever. The catch-as-catch-can methods formerly employed to check the spread of this disease, like the shot gun prescriptions of the old time doctor deserve perhaps a not more distinguished memorial than to be classified with the anomalies and curiosities of preventive medicine. The health officer or his trained assistant who goes about investigating the source of typhoid fever to-day does not spend his time in useless speculation. With as complete a list as possible of the known cases in his possession, he obtains as speedily as he is able, the time of onset for the first case visited, and from this initial information he is able to secure approximately the time when infection took place, also the source or sources of his milk supply, drinking water, foods eaten, and his probable association with others who have been sick. This knowledge coupled with similar information with regard to one, two, or half a dozen other cases under investigation will probably lead him to certain coincidences in the histories obtained with respect to some of the items inquired into, and dissimilarities concerning others. If the milk supplies used by the primary cases under consideration have been the same, milk, as the origin of the outbreak remains a possibility, but if the milk supplies have been different, milk as a causative factor, with certain exceptions where extra supplies enter into the calculation, can safely be eliminated. Investigations can be made, and appropriate conclusions reached in a similar way with

reference to the water supply of the patients. If the cases all originated in one particular section of a city or town, the inhabitants of which are all supplied from a common reservoir, the water supply can with comparative certainty be eliminated from suspicion. I cannot do more in the time at my disposal than to give these one or two examples, illustrative of the method used by the epidemiologist in going about his work. To suggest in detail the number and complexity of the situations which may present themselves for his consideration, and which it is his duty to untangle and to arrange in their true relationship and the order of their significance to the problem he has in hand, cannot be attempted.

It is not sufficient for the trained investigator that a probable route of infection be indicated, and the circumstantial evidence made to tally with his tentative findings. It is his duty, in incriminating a water supply, a milk supply, or other cause as the source of typhoid fever, and more especially in view of recent decisions handed down by the courts of this province with respect to the liability of municipal corporations for the payment of damages for neglecting the prevention of typhoid, to make sure that his findings are correct, that they are consistent with all the facts he has been able to bring to light, and that they establish beyond possibility of reasonable doubt, the responsibility of the cause to which the disease has been ascribed, as the true and primary cause of an outbreak.

Once the source of an epidemic of typhoid is discovered the measures to be adopted for its control are definite, easily understood and not difficult of application. The patients should be isolated, preferably in a hospital, in a fly-proof room if a proper sanitary environment cannot be provided in the home, and nursing care cannot be afforded by the patient. Release from isolation should not be considered safe until two successive negative cultures of stools and urine, collected not less than 24 hours apart, have been tested at the laboratory. All those in the family of the patient who have been exposed, and contacts among friends and visitors should be promptly immunized with appropriate doses of typhoid vaccine. Bowel and urinary discharges and articles soiled with them, should be subjected to concurrent disinfection. By concurrent disinfection is meant

the application of disinfection immediately after the discharge of infectious material from the body of an infectious person, or after the soiling of articles with such infectious discharges, and the prevention of personal contact with such discharges or articles prior to their disinfection.

Outbreaks of typhoid fever like the recent epidemic in Montreal are a tragic object lesson of how our knowledge with respect to the prevention of a highly fatal disease can be discredited, by lack of ability to apply, for one reason or another, such knowledge in the face of an impending disaster. The general measures for the prevention of typhoid fever have been reiterated times without number. The necessity for the protection and purity of public water supplies and pasteurization of milk supplies, cannot be too strongly nor too frequently insisted upon; the supervision of food supplies and food handlers, the prevention of fly breeding, the supervision of typhoid carriers, the sanitary disposal of human excreta and the immunization by vaccination in communities where the disease is prevalent, are important factors in the control of this disease. As the result of my experience of 22 years with typhoid fever in Hamilton, I would lay special stress on the strict prohibition of going in and out of houses where typhoid exists. Sanitarians have been slow, in my opinion, to realize the ready communicability of typhoid germs from sick to well persons. The transference of the virus from the patient or his surroundings to fingers, and from fingers to mouth of those in a state of susceptibility, is an easy and common mode of infection, and should never be forgotten. Typhoid fever is a contagious disease, and its eradication cannot be successfully accomplished until it is treated accordingly.

DIPHTHERIA

The control of diphtheria, until the work of Park, Ziegler and Schroeder in the schools of New York City became generally accepted, was one of the most perplexing problems of the health officer. Until the results of their work became known there was a steady increase in the case incidence, although the case fatality, due to the almost universal use of antitoxin, was diminishing. The mild cases which play so important a part in the spread of epidemics,

notwithstanding the provision of laboratory facilities for diagnosis, and the employment of school and public health nurses for the finding of these cases, continued to escape detection. In spite of our laboratory knowledge of the specific organism, methods of isolating carriers of either temporary or more permanent types, and of attempting to effect the disappearance of these persistent organisms from the noses and throats of those harbouring them, were of little avail. We do not know the mechanism of development of the carrier state; we do not know accurately the number of carriers in the community; and the practical difficulties in the way of seeking out and finding these carriers, economic and otherwise, have been sufficient to counterbalance any tangible and beneficial results obtained. For instance Perkins, Miller and Ruh in Cleveland made records during three years concerning the length of quarantine in 4,853 houses. The average length of quarantine was 20.5 days, and the release cultures became negative in periods from 3 to 90 days. A few of the cultures were positive after 90 days. Wadsworth in 380 convalescent carriers found 337 or 88.6 per cent virulent. Bullock and others took 610 cultures from close contacts in institutions, barracks and hospital wards; 93 were positive morphologically, of which the entire number were virulent. In 10,833 cultures from infected houses they found 892 or 8 per cent positive, and of these, 866 were virulent. These figures indicate in their opinion, that when the contact is close the number of infected persons is high, and that practically all strains of the bacillus diphtheria, isolated from contacts, are virulent. Goldberger, Williams and Hacktel of Detroit found that about one in 100 cultures, taken from the general population of the city, showed the diphtheria bacillus, and of these one in ten was virulent. Bull, Havens, Doull and Phales found that in November and December the percentage of virulent carriers in the different school populations is 3.29; during February and March it is 1.49; during May and June 0.87 and during August 0.19. These findings from convalescent carriers, contacts, healthy non-contacts, and healthy school children give some idea of the difficulties presented by the carrier problem to the health officer of the more thickly populated communities, the danger of the convalescent to

the public, and the necessity for his isolation. Isolation of the known cases until cultures from the nose and throat fail to show the presence of diphtheria bacilli, and the quarantine of exposed persons until bacteriological examination reveals them to be non-carriers, are important in the control of diphtheria. While the search for and detection of carriers, and the placing of restrictions upon these until a reliable estimate can be made on their ability to infect has a beneficial effect in the same direction, it is our opinion that the best and most practical method for the elimination of the disease is by the widespread use of the toxin-antitoxin or toxoid.

For the five year period from 1905 when I became health officer of Hamilton until 1909 inclusive, we had 818 cases of diphtheria with 83 deaths, from 1910 to 1914, 691 cases with 70 deaths, from 1915 to 1919, 1,001 cases with 116 deaths, from 1920 to 1924 inclusive, 2,833 cases with 175 deaths.

In January, 1922, an immunization clinic was established in the Health Centre where facilities

were available for the work. The Board of Education gave its consent to carry on the work in the public schools and the school medical officer, Dr. J. E. Davey gave his sympathetic assistance to our efforts. Since the commencement of our immunization campaign there have been approximately 16,000 children of school and pre-school age treated at the school and Health Centre clinics.

In 1921 there were 608 cases with 41 deaths.
In 1922 there were 747 cases with 32 deaths.
In 1923 there were 381 cases with 26 deaths.
In 1924 there were 501 cases with 32 deaths.
In 1925 there were 232 cases with 14 deaths.
In 1926 there were 121 cases with 3 deaths.

For the first seven months of 1927 there have been 15 positive cultures reported from the laboratory and one death attributed to diphtheria, upon which a positive culture was not obtained, and our diphtheria hospital of forty beds has been practically depopulated for more than a year.

The result of the campaign, we think, justifies our statement to the public that diphtheria can with certainty be prevented, and that in a few years it can be banished from the city.

INDICATIONS FOR INTRATRACHEAL ANÆSTHESIA

By C. C. STEWART, M.D.

Montreal

THE subject of intratracheal anæsthesia has been exhaustively discussed from many aspects. I purpose briefly to present for your consideration its use as a routine anæsthetic in certain operations, and to attempt to justify that use by pointing out some advantages accruing to patient, surgeon and anæsthetist.

To the surgeon and anæsthetist these advantages are mainly those of technique, the patient in addition, obtains physiological benefits.

The following figures represent anæsthesias for twelve months in the main operating rooms of the Montreal General Hospital:—

	No.	Percentage.
Chloroform	34	1.0
Spinal—Sacral	342	10.5
Gas and Oxygen	697	21.3
Intratracheal gas	41	1.3
Intratracheal ether	680	20.8
Open ether	1478	45.1
	3272	

Operations under intratracheal ether anæsthesia

Nose and throat	371
Head, neck, eye	117
Abdominal	130
Others	62
	680

In nose and throat and oral surgery this technique is used in practically all cases. No method of anæsthesia is perfect which interferes with or hampers the operator in any way, and intratracheal anæsthesia appears to approach that ideal. The surgeon is not conscious of the presence of the anæsthetist, except in so far as he may be an aid to him by steadying the head and manipulating the mouth suction. Ample freedom is allowed the surgeon for the most careful dissection and ligation, with no interruption for re-application of the mask, as is occasionally necessary with other methods.

Aspiration of foreign material during opera-

tions in these regions is rendered practically impossible, both by the presence of the catheter in the glottis and the direction of the prevailing stream of air. Since 1914 only one case of lung abscess has been recorded following tonsillectomy in this hospital. Post-operative incidence of tracheitis is practically negligible, though a previously existing chronic tracheitis would contra-indicate its use. Insufflation of the lungs with pure air towards the end of operation ensures full restoration of the reflexes before withdrawal of the tube, and to this end no preliminary morphine medication is desirable.

In operations on the *face, head and neck*, intratracheal anæsthesia is used largely on account of the mechanical advantages it confers. Aseptic technique is here a factor which is absent in the buccal and nasal cavities. Efficient preparation and draping of the field are possible only when the anæsthetist and his apparatus are at a distance. Posture of the patient on the table must be subordinated to the locus of the operation and the lateral or prone position tends to embarrass the breathing and to prevent the proper observation of the patient by the anæsthetist. Delivery of the anæsthetic vapour directly into the trachea precludes the occurrence of that most common complication of anæsthesia, dyspnea from buccal or pharyngeal obstruction, necessitating interference by the anæsthetist and consequent break in operative sequence and technique. With a suitable apparatus the rate and amplitude of respiration can be clearly observed and changes in the depth of the narcosis can be detected by the trained ear, without resort to visual observation of the eye reflexes or other signs. Respiratory obstruction due to mucus or excessive salivation seldom occurs after the catheter is introduced. These effects are mainly due to local irritative action on the glandular structures in the mouth and usually cease as soon as the vapour is introduced directly into the lungs.

In *cervical operations*, involving long tedious dissections, the absence of spasmodic changes in respiration with coincident venous congestion helps in preventing excessive blood loss and lessens tissue damage.

In *thoracic surgery and breast amputations* the local advantages are not marked, but the more effective draping, the ease of posture and

the subdued breathing all tend to lessen the strain on the operator.

In operations on the *spinal canal* with the patient in the prone position the anæsthetist is left free to assume general control of his patient, to supervise the injection of intravenous solutions and take frequent blood pressure readings, and to do these things more effectively than if he were crouched in an ether saturated tent under the patient's face.

The application of intratracheal anæsthesia to *upper abdominal surgery* has been criticized as unnecessary and even far fetched. This is the class of operative risk requiring the utmost care and skill of the administrator. Intestinal obstruction, gall bladder disease, perforated viscus, malignancy, often complicated by advanced age, shock and cardiac insufficiency, present many difficulties even to the competent anæsthetist. Our experience in many hundred of these and allied conditions confirms the belief that shock during operation and post-operative morbidity is less with this method.

Even in young healthy subjects some startling advantages may be noted. Under open ether the resources of the anæsthetist are often taxed in producing and maintaining sufficient muscular relaxation to enable the surgeon to do his work. Lack of proper oxygenation is mainly accountable for this difficulty and this may be caused by a mask saturated with ether and moisture, or by spasm of the larynx resulting in crowing respiration or obstruction by tongue or mucus. In such a patient the introduction of the catheter changes the picture entirely. The colour becomes pink, respiration is quiet and almost wholly thoracic and muscular rigidity disappears. Relaxation is usually satisfactory even in a light stage of anæsthesia, with moderately contracted pupils and active light reflex. Anæsthesia may be deepened by increasing the percentage of ether for exploration or closure, and de-etherization carried out through the catheter at end of operation. The anæsthetist is free to deflate the stomach if necessary and to wash it out at the end of operation.

Owing to the absence of swallowing and of increase of intrapharyngeal pressure, dilatation of the stomach does not occur. In the cachetic and aged and especially in protracted operations, every consideration is of importance. The absence of cyanosis, hyperpnœa and resulting

respiratory depression, all favour a successful outcome for the bad risk.

Re-breathing is indicated in all operations over an hour and an ordinary large mask or wet towel over the face suffices for that purpose.

Interruption of the delivery stream several times a minute, as is usually advocated, does not seem necessary.

May I quote the surgeon's point of view:—"The patient stands intratracheal anaesthesia longer than open ether without fatigue, the pump saves respiratory effort. The anaesthesia is more even, the mucus less, he has less often bronchitis and the operator finds his patient that night and next day in better condition. The patient has less after vomiting, often a protracted gall bladder or stomach case has none. The experienced operator welcomes it for:—

- (a) The better aseptic field of operation.
- (b) The less crowded and more accessible field of operation (fewer hands).
- (c) The quieter, easier respiration.
- (d) The more perfect relaxation in abdominal surgery.
- (e) The better after condition of the patient.
- (f) The fewer respiratory after complications."

NITROUS OXIDE-OXYGEN ANÆSTHESIA INTRATRACHEALLY

The somewhat extensive use of intratracheal ether anaesthesia in the Montreal General Hospital has led to the attempt to apply this technique to the administration of nitrous oxide and oxygen. The following notes were made from observation of a small series of cases, numbering forty-nine, since October, 1926.

At the outset it is not claimed that this method can be applied universally, but should be restricted rather to cases that might fairly well be considered good prospects for administration of gas oxygen by the usual method. Preliminary medication, always important from the anaesthetist's point of view, becomes of vital importance in these cases, and the few occasions on which it was omitted entirely gave ample evidence of this. Morphia, grs. $\frac{1}{4}$, scopolamine, gr. $\frac{1}{200}$, one and one-half hours before operation, followed by morphia, grs. $\frac{1}{6}$, one-half hour before operation, varied slightly according to age and weight of patient, usually suffices to put the patient into a tranquil frame of mind and,

what is more important, depresses the pharyngeal and laryngeal reflexes to the required extent. The use of cocaine applied locally to the mucous membranes is not advocated, as toxic reactions have been noted following this. A certain amount of practice in passing the intratracheal catheter is necessary.

The patient is anaesthetized in the ordinary way with the full face mask and the catheter, a No. 24 French, introduced by means of the direct laryngoscope. In a few cases of the resistant type, small amounts of ether were added during the induction, but this was not found necessary after the tube was in place.

In some cases complete inhibition of respiration comes on after insertion of catheter, but is usually of short duration. The gases are allowed to flow gently with about 10 per cent of oxygen and with the natural accumulation of CO_2 breathing soon re-commences. We have been in the habit of using a mixture of O_2 95 per cent and CO_2 5 per cent. Because of the large size of the catheter certain precautions should be taken. The catheter should be marked at a distance of 27 centimetres from its tip and this mark should lie at the upper incisor teeth. This ensures that the tip will be not less than 4 cm. above the bifurcation of the trachea. The gas machine should have an efficient adjustable blow off valve to prevent any excess pressure in the lungs. From 20 to 30 mm. Hg. appears to be a suitable pressure. Breathing is quiet and slow and from one to two gallons of gases per minute keeps the re-breathing bag at moderate tension. At this rate of flow the method appears to be more economical than other types of administration.

Excessive dilution of the gases by air may be prevented by plugging the pharynx with absorbent swabs. The presence of an unlimited supply of oxygen, which can be delivered directly into the trachea at any stage of the operation, ensures a most efficient method of artificial respiration if required.

In cases where the administration has proceeded past the stage of intubation, and struggling and cyanosis continue, it is not advisable to persist in the method.

All types of individuals have been included in this series, except children, the ages ranging from 14 to 74 years, and in no case has there

been any complaints from the patient or unpleasant post-operative sequelæ. Post-operative nausea is absent and vomiting is not any more common than that following the usual gas oxygen anæsthesia.

Pathological conditions complicating operations included active and latent tuberculosis, chronic nephritis and valvular disease of the heart. Duration of operation varied from ten minutes to one hour, the latter period in a woman of seventy-four years. In one exception, for excision of the larynx, gas oxygen anæsthesia was induced and maintained successfully for two hours through the severed trachea.

Operations performed under this form of anæsthetic were tonsillectomies, submucous resections, radical antrums and extraction of teeth, but its use in thyroidectomies, face and chest work seems feasible.

It is not claimed that this method will supplant intratracheal ether, but that in a limited

number of cases where the use of ether is contra-indicated and the proximity of the anæsthetist is not desirable, intratracheal gas oxygen may prove useful.

From the observations made on this series the writer concludes that success lies in the use of the catheter of larger calibre to secure exclusion of atmospheric air. The addition, possibly, of some device to absorb the exhaled CO₂ would make for greater economy and would enable the anæsthetist to administer the gases with the same exactitude as with the ordinary closed method.

The advantages claimed are:—

1. Absence of nausea and vomiting.
2. No possibility of aspiration of foreign material.
3. Induction and recovery pleasant.
4. Maintenance of pressure in intrathoracic operation.
5. Economy of administration.

A NEW DEVICE FOR THE TREATMENT OF PROLAPSE OF THE RECTUM

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PROLAPSE of the rectum, while rarely in itself a serious condition, is often a most terrifying one to the parents, and frequently also taxes the patience of the physician. Besides strapping, other methods of treatment have been recommended, but these are so serious in themselves as to render questionable the advisability of resorting to them in a condition which in itself is not dangerous to life. Such methods of treatment as the injection of alcohol, or paraffin, or resection of the redundant bowel hardly seem justifiable. Proper strapping is, in itself, quite effective. The purpose of strapping is to give support to the buttocks and anus at the time that the bowels are acting. Support at other times is entirely unnecessary. The objection to strapping, therefore, is that the child is subjected to the constant discomfort of

a tight strap on the buttocks at times when it is not needed. The constant wearing of an adhesive strap is frequently the cause of skin irritation. Moreover, the warmth of the body causes the adhesive to give way, therefore lessening the effectiveness of the strapping, and making necessary frequent changes.

With the idea, therefore, that support is necessary only at the time of action of the bowels, I have devised a small stool which gives this proper support at the time when it is needed. The ordinary toilet seat, or stool, on which a child sits, causes wide separation of the buttocks, and stretching of the anus. This new device consists merely of a toilet seat, the opening of which is narrow and oval. The effect on the buttocks is well illustrated in the accompanying sketches of a child sitting on each

of these seats. It very clearly demonstrates the spreading of the buttocks with the child sitting on the ordinary seat, and the compressing of the buttocks with the child sitting on the seat with the narrow oval opening.

The device is not curative—prolapse of the rectum is effectively cured by time—but it does very efficiently prevent the prolapse from recurring. Such a seat can be made at small



FIG. 1.—Special toilet seat in comparison with the ordinary vessel used for children.

Fundamentals and Clinical Aspects of Light Treatment.—Edgar Mayer, Saranac Lake, N.Y., discusses some physical characteristics of light; the photobiologic and physiologic effects of light; light and moving air from outdoors, and sunlight versus carbon arc and quartz mercury vapor arc lamp. The technique of exposures and methods of dosage determination are described fully. The most favourable response to solar exposures has been shown by the so-called pretuberculosis of children, and by tuberculosis of the lymph nodes (including hilum), the pleura, bones and joints, peritoneum and intestines. Less favourable results are usually obtained in pulmonary, genito-urinary, laryngeal, ocular, aural and cutaneous tuberculosis. With joint tuberculosis the fibrous form of ankylosis has been overcome and joint function has been often restored. With lymph node disease, massive tuberculous glands have been extruded from their capsules during healing by light. Fistulas are more resistant to treatment. With plain or cored carbon arcs of high amperage (from 55 to 75 amperes) or with arcs of lower amperage (from 20 to 29 amperes), the best results have been reported with cutaneous,

cost, the size varying according to the size of the child.

As an instance of the effectiveness of this seat, the following case is worthy of note. A child of two years had had prolapse of the rectum for over a year. This could be controlled so long as the strapping of the buttocks remained effective. When this stool was devised, it was used on this child, with the result that after one year there had never been a recurrence of the prolapse. At the end of this time it was thought advisable to discontinue the use of the stool, but the prolapse recurred the second time that the child had a bowel movement without it.

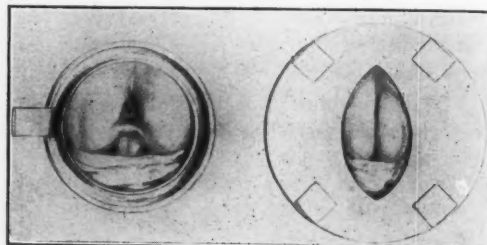


FIG. 2.—Showing the effect on the buttocks of the ordinary toilet seat vs. the new device described. Note the spreading of the nates and the protruding of the rectum in the one case and the compression of the buttocks in the other.

bone and joint, lymph node, laryngeal, peritoneal and ocular (corneal and phlyctenular) tuberculosis; less favourable have been the reports on progressive pulmonary, genito-urinary and intestinal tuberculosis. In Mayer's own experience of ten years with the use of the quartz mercury vapour light as an adjuvant, the most favourable response has been encountered in intestinal tuberculosis. Other forms of tuberculosis which are frequently responsive to mercury are light exposures are the "hilum glandular" or so-called hidden tuberculosis of children and adults; the superficial forms of tuberculosis, such as the cutaneous, oral or pharyngeal, laryngeal (except the acute and the edematous forms), corneal and phlyctenular ocular tuberculosis, and the lymph node and peritoneal tuberculosis. Reliance on artificial sources of light as an important aid in pulmonary tuberculosis is not to be encouraged. Mayer emphasizes that light of any form by itself is not curative but comprises only one of the important adjuvants in the treatment of tuberculosis.—*J. Am. M. Ass.*, July 30, 1927.

COMMERCIAL PHARMACEUTICAL PREPARATIONS*

3.—BELLADONNA LEAVES

BY H. M. LANCASTER AND A. L. DAVIDSON

Department of Health, Ottawa

THE British Pharmacopœia directs that dried leaves¹ be used for the preparation of tincture² and dry extract³ of belladonna. The change from the root was made in 1914 in order to conform more nearly with the terms of the International Agreement of 1906, and in the case of the latter to replace the less satisfactory "green" extract by one upon which greater reliance could be placed. In the United States, dried leaves and tops⁴ constitute the basis for nearly all belladonna preparations.

Our requisition covered both leaf and root products; but of the former, only the tincture was desired. Either as a result of ignorance or of the custom of substituting the nearest in stock, many vendors supplied fluid extract of the root, whilst one manufacturer labelled his bottle "Fluid Extract of Belladonna Leaves, B.P." a designation which does not describe anything in the British Pharmacopœia. Inasmuch as leaf extracts are only some 40 per cent of the strength of B.P. liquid extract,⁵ such substitution is to be deprecated. Another firm of manufacturers, whose sample of leaf tincture was lost by being spilt and who were invited to furnish a fresh one, submitted a sherry brown fluid labelled Tinct. Belladonnæ, British Pharmacopœia.

Tincture of Belladonna, B.P., is prepared by percolating powdered leaves of good quality with 70 per cent alcohol and is required to contain between 0.033 and 0.037 per cent alkaloids when submitted to the official test. The American tincture⁶ is prepared along similar lines, but is not quite so strong (0.027-0.033 per cent alkaloid). Fluid extractum Belladonnæ Foliorum, U.S.P.,⁷ made in the usual manner, is just ten times as potent as the tincture. The British and American methods of

standardization are virtually the same, but in this investigation the former was closely followed wherever differences arose. In addition to the determination of alkaloid, it was thought desirable to record the specific gravity and the proportion of extractive in order to correlate samples of the same batch from different regions. According to Squire⁸ a properly prepared tincture should have a specific gravity of about 0.892 and contain about 1.5 per cent w/v of total solids. The results are detailed in Tables A and B.

One example of ointment came in, labelled "Ung. Belladonnæ, U.S.P." This, when examined by a method devised by Bird and endorsed by Parry,⁹ was found to contain 0.11 per cent alkaloid. The ointment authorized for use in the United States¹⁰ consists of a mixture of 10 per cent of pilular extract of belladonna softened with diluted alcohol and incorporated into a mixture of wool fat, petrolatum and yellow wax. Inasmuch as the extract is required to contain between 1.18 and 1.32 per cent of alkaloids, at least 0.118 and not more than 0.136 per cent should be present in the ointment, after allowing for the probable loss of alcohol during manufacture and storage.

Of the fifty-two tinctures examined, fifteen (29 per cent) fall within the limits of alkaloidal strength set by the British Pharmacopœia. Wide variations in the quality of the raw material are revealed indirectly in the figures for total solids, whilst the records of specific gravity indicate a need for greater care in the adjustment of menstrua. Fourteen (26 per cent) so far as the amount of active principle is concerned may be classified as U.S.P. (Xth), but in practically all cases the alcohol used was not that prescribed by the authority. Seven (13 per cent) are slightly above the official standard of potency and six (11 per cent) are substantially overstrength, whilst ten fall below what is required either throughout the British Empire, or in the United States. Inasmuch,

* The third of a series of papers on this subject.
1.—Nux Vomica, *Canad. M. Ass. J.*, July, 1927, xvii, 803-807. 2.—Belladonna Root, *Ibid.*, Aug., 1927, xvii, 923.

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however, as none of those who have supplied a tincture of American potency have ventured to mark their products "U.S.P." only fifteen (29 per cent) may be considered correct.

The fluid extracts are more difficult of appraisal than the tinctures. For one reason, fluid extract of belladonna leaves is not official in Canada, and manufacturers aim at producing

a concentrate for the extemporaneous production of tincture at the dispensing counter. Some of these concentrates are reputed to contain 0.35 per cent of alkaloid and others 0.3 per cent, the strength ordered by the United States Pharmacopœia. This circumstance may possibly explain the weakness of some samples of tincture.

TABLE A
TINCTURE OF BELLADONNA

No.	Name on Label	Appearance	Specific gravity	Percent- age of total solids	Percent- age of alka- loids	Percent- age of discrep- ancy from B.P. 1914	Remarks
1.	Tincture of Belladonna...	Green with brown tinge	0.900	1.63	0.035	-	B.P. 1914.
2.	Tr. Belladonna.....	Yellowish green: rather pale	0.894	0.84	0.027	-22.9	Potency of U.S.P.(Xth).
3.	Tincture Belladonna Leaf.....	Green with brown tinge	0.894	1.44	0.049	+40.0	Decidedly strong.
4.	Tinct. Belladonna.....	Rich deep green: good	0.909	1.45	0.039	+11.4	Alcohol low.
5.	Tinct. Bellad: Leaves....	Green with brown tinge	0.902	2.11	0.037	-	B.P. 1914. Solids high; poor leaf.
6.	Tr. Belladonna.....	Green: bright	0.889	1.41	0.034	-	B.P. 1914.
7.	Tr. Belladonna.....	Green: bright: a little pale	0.895	0.75	0.026	-25.7	-
8.	Tinct. Belladonna Leaves	Beautiful bright green	0.913	1.36	0.035	-	B.P. 1914. Alcohol low.
9.	Tincture Belladonna B.P. 1914.....	Good: rich green	0.898	1.28	0.034	-	B.P. 1914.
10.	Tinc: Belladon: Fol. B.P. 1914.....	Green with decided brown tinge	0.889	1.59	0.038	+8.6	Passable as B.P.
11.	Tincture Belladonna....	Bright green	0.901	1.60	0.030	-14.3	Potency of U.S.P.(Xth).
12.	Tr. Bellad: B.P. 1914....	Green with brown tinge	0.886	1.49	0.029	-17.1	Potency of U.S.P.(Xth).
13.	Tr. Belladonna.....	Brilliant green	0.894	1.57	0.037	-	B.P. 1914.
14.	Tincture Belladonna B.P.	Green with brown tinge	0.908	1.60	0.027	-22.9	Potency of U.S.P.(Xth).
15.	Tinct. Belladonna.....	Bright green: very good	0.910	1.08	0.039	+11.4	Alcohol low.
16.	Tincture Belladonna B.P.	Bright green: very good	0.887	1.26	0.037	-	B.P. 1914.
17.	Tr. Belladonna, from concentrated tincture.	Brownish green: slightly turbid	0.896	1.62	0.039	+11.4	-
18.	Tinct. Belladonna, leaves	Bright green: very good	0.888	1.52	0.029	-17.1	Potency of U.S.P.(Xth).
19.	Tinct. Bellad: B.P.....	Beautiful bright green	0.897	1.38	0.035	-	B.P. 1914.
20.	Tr. Belladonna.....	Bright green: good	0.902	1.63	0.033	-	B.P. 1914.
21.	Tr. Belladonna.....	Bright green: very good	0.889	1.80	0.046	+31.4	Decidedly strong.
22.	Tincture Belladonna....	Brownish green: bright	0.907	1.41	0.039	+11.4	Alcohol weak.
23.	Tr. Belladonna.....	Beautiful bright green	0.885	1.23	0.030	-14.3	Potency of U.S.P.(Xth).
24.	Tr. Belladonna.....	Brownish green: bright	0.904	1.28	0.021	-40.0	Decidedly weak.
25.	Tinct. Belladonna.....	Green: deposit	0.887	1.21	0.046	+31.4	Decidedly strong.
26.	Tr. Belladonna.....	Bright green: very good	0.833	1.45	0.030	-14.3	Potency of U.S.P.(Xth).
27.	Tr. Belladonna.....	Bright green: rather deep	0.894	1.62	0.051	+45.7	Decidedly strong.
28.	Tr. Belladonna.....	Bright green: very good	0.887	1.35	0.033	-	B.P. 1914.
29.	Tr. Belladonna, B.P.....	Brilliant green	0.894	0.75	0.030	-14.3	Potency of U.S.P.(Xth).
30.	Tinct. Belladonna B.P. 1885.....	Brown with green tinge	0.945	0.77	0.006	-82.9	No standard for alkaloid in B.P. 1885. Alcohol too low; worthless.
31.	Tinct. Bellad: Fol:.....	Green with brown tinge	0.895	0.98	0.013	-62.9	Very poor leaves.
32.	Tinct. Belladonna Standardised to contain 0.035% alkaloids....	Green with brown tinge	0.953	1.87	0.003	-91.4	Alcohol also low; worthless.
33.	Tincture Belladonna B.P. 1914.....	Green; bright	0.902	1.20	0.019	-45.7	Very poor.
34.	Tincture of Belladonna B.P.....	Deep green	0.900	1.85	0.035	-	B.P. 1914.
35.	Tincture Belladonna B.P.	Bright green	0.900	1.64	0.031	-11.4	Potency of U.S.P.(Xth).
36.	T. Belladonna.....	Green with brown tinge	0.888	1.76	0.035	-	B.P. 1914.

TABLE A (Continued)
TINCTURE OF BELLADONNA

No.	Name on Label	Appearance	Specific gravity	Percent- age of total solids	Percent age of alka- loids	Percent- age of discrep- ancy from B.P. 1914	Remarks
37.	Tr. Belladonna: B.P. . . .	Bright green: excellent	0.887	1.28	0.042	+20.0	
38.	Tinct: Bellad: B.P.	Green with brown tinge	0.905	1.51	0.039	+11.4	
39.	Tr. Belladonna: B.P. . . .	Green with brown tinge	0.910	1.44	0.033	-	B.P. 1914. Alcohol low.
40.	Tinct. Belladonna	Green with brown tinge	0.891	1.85	0.038	+ 8.6	Passable as B.P.
41.	Tincture Belladonna, B.P. 1914.	Green	0.903	1.66	0.042	+20.0	
42.	Tr: Belladonna: B.P. 1914.	Green: bright	0.890	1.67	0.033	-	B.P. 1914.
43.	Tinct: Belladonna: B.P. 1914.	Bright green	0.894	1.19	0.030	-14.3	Potency of U.S.P.(Xth).
44.	Tinct. Belladonna	Beautiful bright green	0.889	1.52	0.037	-	B.P. 1914.
45.	Tr. Belladonna B.P.	Green: pale: slight de- posit	0.910	0.95	0.027	-22.9	Alcohol low.
46.	Tinct. Belladonna	Beautiful bright green: slightly pale	0.897	1.17	0.030	-14.3	Potency of U.S.P.(Xth).
47.	Tr. Belladonna	Brown with green tinge	0.921	0.60	0.013	-62.9	Very poor: alcohol low.
48.	Tinct: Belladonna Leaves	Green with brown tinge	0.891	1.71	0.030	-14.3	Potency of U.S.P.(Xth).
49.	Tr: Belladonna: Fol: B.P.	Bright: good green col- our	0.884	1.09	0.025	-28.6	Decidedly low.
50.	Tinct. Belladonna	Bright green: pale	0.901	0.64	0.019	-45.7	Very poor.
51.	Tr. Bellad: B.P. 1914. . .	Brown with faint green tint	0.931	0.92	0.017	-51.4	Very poor: leaves also poor and alcohol low.
52.	Tinct. Belladonna	Beautiful green: bright: but slightly pale	0.888	1.27	0.027	-22.9	Potency of U.S.P.(Xth)

Most of the tinctures were bright, but here and there one found turbidity and precipitation. This is doubtless attributable to the method of preparation by diluting a concentrate of slightly different alcoholic strength. It is significant that the compilers of the United States Pharmacopœia, notwithstanding the inclusion of a convenient fluid extract and with the precedent of the 1898 British Pharmacopœia before them, have provided that the tincture be made directly from the crude drug. No doubt those who devised formulæ for "F.E. Belladonna for B.P. tincture" took pains to see that the dilutions were stable products, but there exists in the background the silent hint that no part of the preparation should be subjected to the action of heat, which cannot be beneficial either to colour or potency. Moreover, as Davy has pointed out,¹¹ where a menstruum used for producing a fluid extract is different from that of the tincture prepared from it, the resulting preparation will not be like the official one.

Deterioration during storage may account for some of the low results recorded. One writer found pressed leaves to remain permanent over a number of years, but another suggests a de-

terioration of 0.1 per cent in alkaloidal strength (e.g., from 0.5 to 0.4 per cent) of leaves and green extract takes place per annum. No doubt, conditions of storage are very important, probably the most important feature in studying the deterioration of galenicals; especially important is protection from exposure to extremes of heat and cold. A very good product, if stored under bad conditions, may easily become turbid and throw down a deposit carrying a portion of the active principle with it.

After all errors attributable to manufacture, storage and sale have been eliminated, there still remains the preponderating factor of the raw material. During the World War of 1914-1918, the beleaguerment of Germany was responsible for cutting off a considerable proportion of the supply of belladonna with the result that adulteration and substitution were rife; even yellow dock has been passed off as belladonna. The absurdly low results given by tincture samples, Nos. 30, 31, and 32, would lead one to think that the raw material was not genuine.

The appearance of the herb alone is not a trustworthy guide: the analyst must always co-

TABLE B
FLUID EXTRACT OF BELLADONNA LEAVES

No.	Name on Label	Appearance	Specific gravity	Percent- age of total solids	Percent- age of alka- loids	Percent- age alkaloid specified by manufac- turer	Remarks
1.	Ext. Fluid Belladonna Teint.....	Green: clear	0.937	5.28	0.145	0.30	Half strength.
2.	Fl. Ext. Belladonna L....	Deep green: clear	0.964	16.11	0.325	0.35	Passable.
3.	Fluid. Ext. Belladonna..	Brownish green: clear	0.944	12.03	0.369	0.35	Passable.
4.	Fluid Extract Belladonna.....	Dark green: good colour: clear	1.035	24.78	0.468	0.35	33% too strong.
5.	Fld. Ext. Belladonna.....	Greenish: turbid deposit	0.955	12.15	0.137	0.30	Less than half strength.
6.	F. Extract Belladonna..	Green: turbid	0.944	10.74	0.311	0.35	
7.	Fluid Extract Belladonna Lvs.....	Brownish: rather poor	1.006	15.12	0.347	?	
8.	Fld. Ext. Belladonna.....	Brownish	1.018	17.17	0.205	?	Poor leaves.
9.	Fl. Ext. Belladonna Leaves.....	Green with brown tinge	0.967	13.03	0.289	0.35	
10.	Fluid Ext. Belladonna Leaves.....	Green	0.955	13.96	0.331	0.35	Passable.
11.	F. E. Belladonna Leaves	Brownish green. Fair	0.960	10.51	0.289	?	
12.	Fluid Extract Belladonna Leaves.....	Green	0.953	11.57	0.318	0.30	Passable.
13.	Liquid Extract Belladonna Leaf.....	Dense green: bright	0.975	14.96	0.304	0.35	
14.	Fluid Extract Belladonna Leaves.....	Dense green	1.003	18.12	0.427	0.35	
15.	Fluid Extract Belladonna Leaves.....	Very deep green: clear	0.948	15.46	0.375	0.35	Passable.
16.	Ext. Bellad. Fol. Fl.....	Rather brown: not good	0.956	18.00	0.333	?	Possibly a root product
17.	Fld. Ext. Belladonna Leaves.....	Green with brown tinge	0.989	11.63	0.253	0.35	Decidedly weak.
18.	F. E. Belladonna Leaves	Green	0.965	12.47	0.318	0.35	
19.	Liquid Extract Belladonna Leaves.....	Deep green	0.976	15.31	0.296	0.35	
20.	Liquid Extract Belladonna.....	Deep green	0.939	10.92	0.289	0.35	
21.	Fluid Extract Belladonna Leaves B.P.....	Brown: not good	1.010	8.33	0.260	?	No chlorophyll: must be a root product.
22.	Fluid Extract Belladonna Leaves.....	Brown: poor	-	-	0.161	?	Obviously a root preparation.
23.	F. E. Belladonna Leaves	Bright green	-	-	0.289	0.35	
24.	Fluid Extract Belladonna	Green with brown tinge	-	-	0.344	0.35	Passable.

operate with the pharmacognosist. Large leaves in fine condition sometimes contain very little alkaloid, whilst leaves of poorer appearance have sometimes a higher alkaloidal content. Nominally, preparations of belladonna leaves should be rich green in colour, but the green may be associated with brown where much stalk, flowers or berries are present and in cases where the leaves are withered or have been subjected to none too careful drying. Our samples have varied from brilliant shades of green to browns scarcely distinguishable in appearance from preparations of the root.

The selection of raw material is a very important feature of the manufacturing pharmacist's business. The existing practice of buying

from jobbers of repute, and without previous inspection and chemical or biological examination by the purchaser cannot be too strongly condemned. Miller¹² has called attention to the surprising amount of crude drugs of inferior quality offered on the markets of to-day; old, effete and mouldy drugs; herbs collected out of season and imperfectly cured; admixed with worthless adulterants and gathered by unintelligent and irresponsible collectors. The larger houses in Britain and in the United States have taken the wise precaution of starting from the beginning in the field, planting, husbanding and reaping their own crops of belladonna and other important drugs. Not only is this the

most satisfactory foundation for a trustworthy guarantee, but investigation and experience have shown, as the years have rolled by, that very large yields of alkaloids can be obtained by cultivation under carefully observed conditions. Adams¹³ is of the opinion that belladonna can be grown in the warmer parts of Canada, and indeed at the University of British Columbia, it has been shown that cultivation is quite successful, from the standpoint of quality.

Two points seem to stand out for mention in conclusion. In the first place, some definite steps will have to be taken to get rid of the ambiguous nomenclature that is causing general confusion. Secondly, manufacturers will have

to pay greater heed to the conformity of their products with existing standards.

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HEREDITARY ABNORMALITIES OF THE EYE*

VI. PART I. INHERITABLE DEFECTS INVOLVING THE RETINA

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UNDER this classification come a great many diverse conditions, of widely differing degrees of severity, from those that inevitably result in blindness and death, to those that cause the inconvenience of not being able to distinguish colours. Because of their great number and importance, several articles will have to be devoted to this group of affections.

NIGHT BLINDNESS

This affection is of interest from several viewpoints. First of all may be mentioned the strangeness of the affection itself, for the patient who can see perfectly well during the day and fairly well in a brightly lighted room, is

practically blind if placed in the dark or in dim lights. The second point of interest is, that as far as I am aware, the largest human pedigree ever constructed, tracing the descent of any one defect, was compiled by Nettleship¹⁹ from the record of a French family in which uncomplicated night blindness had existed through ten generations. There were over 2,100 persons in the pedigree, and of these approximately 150 were night-blind. Due, in some cases at least, to a lack of visual purple in the rods of the retina, this affection assumes two forms. In one it is uncomplicated by any other eye defect. In the other it is associated with strabismus, nystagmus, etc. In the former cases, it acts as if due to a dominant factor, never being transmitted by those free from it and most apt to show in some of the children of those who exhibit it.²²

If, however, the night blindness be accompanied by some other ocular defect, such as myopia, strabismus or nystagmus, the type of descent changes from the dominant, which affects

* Part I, Laws of heredity and their exemplification in the inheritance of eye colour, *Canad. M. Ass. J.*, Nov., 1926, xvi, 1340. Part II, Inheritable defects involving the eyelids and their mode of transmission, *Ibid.*, Jan., 1927, xvii, 55. Part III, Anomalies of the entire eyeball, *Ibid.*, Mar., 1927, xvii, 327; April, 1927, xvii, 421. Part IV, Inheritable diseases affecting the conjunctiva, *Ibid.*, June, 1927, xvii, 697. Part V, Inheritable defects of the iris and lens, *Ibid.*, Aug., 1927, xxvii, 937.

both sexes equally, to the sex-linked recessive, in which the unaffected female transmits the defect to the affected male. Such a pedigree from Newman²⁰ was shown in connection with the inheritance of pterygium in Fig. 11.¹⁰ Another very typical pedigree illustrating this type of inheritance is that reported by Nettleship,²¹ (Fig. 21), in which this peculiarity had de-

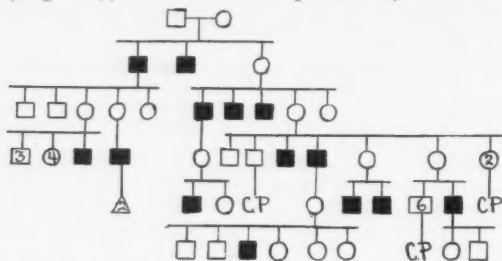


FIG. 21.—Pedigree of night-blindness showing the sex-linked recessive mode of inheritance. The defect was associated in this family with high grade myopia, nystagmus, and other ophthalmoscopic changes. C.P. indicates clear progeny; triangles indicate sex unknown. After Nettleship.²¹

scended through five generations affecting fourteen males. It had always come down through the unaffected mother, who in turn had received the factor from her night-blind father or from her unaffected mother. In the case of three of the males in the fifth generation the defect had been transmitted latent through at least four generations of females, while four of the males had had a grandfather affected. Symonds²⁸ records two boys, children of first cousins, who showed night blindness. The three sisters were normal. He attributes these cases to the consanguineous marriage, which would place the inheritance in this family as due to a pure recessive factor. The probabilities are that it is to be classed as a sex-linked recessive inheritance and that the two boys received the factor from their mother who was a carrier. (Mating IX¹⁴).

In Fig. 22 is given the pedigree of a family in which night blindness was transmitted as a dominant character. This pedigree has been chosen to illustrate this type of inheritance in night blindness, not only because it shows the typical descent of a dominant character, but also because the night blindness was distinctly unusual in this family. As Nettleship²² has pointed out, there is usually no associated eye defect when the transmission is of the dominant type, and he reports several pedigrees in support of this. In Bordley's³ family history, (Fig. 22)

however, although there seemed to be no associated eye defect, the disease was not limited, according to him, to mere lack of visual purple; there was an associated brain defect that was a component of the picture. Very interesting were his observations on the early sclerotic changes in the arteries of this family, that may have had some significance in the development of the night blindness. With increasing age, the visual fields contracted so that the patients became totally blind, and so closely did death follow upon the complete loss of vision, that the family themselves knew that death was only a matter of a few months after blindness had ensued. The gradual onset of total blindness followed by death seems to have been peculiar to this family, as I have not noticed it in the records of any of the other families suffering from this defect, which I have encountered in the literature.

Bordley's³ description of the condition depicts well the decided inconvenience to which these people are subjected because of their defect, even if it is not so serious as some other types of blindness. These persons had to cease work

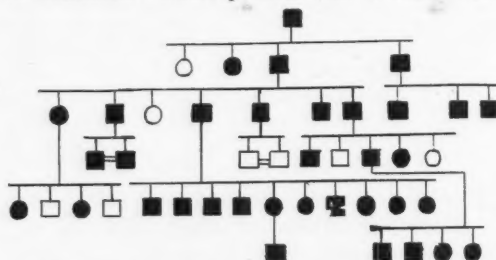


FIG. 22.—Pedigree of night-blindness showing the dominant mode of inheritance. Note the large proportion of the family which shows the defect, also that twinning runs in the family. The rule that twins indicated by = tend to be of the same sex and identical in appearance, if the twinning comes from the paternal side of the family, is borne out in this pedigree. The night blindness was unaccompanied by other ocular defects in this family. After Bordley.³

at sunset, artificial light being of no use to them unless they were directly in its glare; when they walked along the street they would walk into buildings and even stumble into brightly lighted lamp-posts exactly as a person totally blind would do. Nettleship in describing another family mentioned how one boy stumbled about a lawn in brilliant moonlight, unable to see the white handkerchief which they had left there to test his vision, although it was plainly visible to all who were watching, even at a considerable distance. In the French family referred to

above, the parish priest who helped Nettleship¹⁹ to compile the records, stated that those affected with this curious condition endeavoured to keep it secret, inasmuch as it was deemed a barrier to their marriage, and he cited the case of one woman who, for a long period of years, had successfully concealed from her husband her inability to see in the dark.

With such a condition, how should we advise the patient? Assuredly, in those families in which the night blindness is accompanied by other defects, such as nystagmus, high grade myopia, strabismus, etc., men who are affected, and daughters and sisters of such men should not have children. In families in which the night blindness is uncomplicated, patients should be advised as to their capacity to transmit their defect to their offspring, and as to the handicap which it will be to them, but it might be difficult to persuade either a person or a community that such individuals should not reproduce. Certainly if they attempted to occupy positions in which they depended upon their vision after dusk, as is necessary in practically all work in winter days, they would be at a disadvantage with their normal fellows, and many things, such as motoring, theatres, reading at night, etc., would be as impossible for them as they would be for the really blind.

DAY BLINDNESS

The opposite condition is very rare, and according to Nettleship²¹ is always accompanied by colour blindness and amblyopia; it is congenital, and tends neither to improve nor regress. It is supposed to be caused by a deficiency in the cones. On the whole its mode of inheritance appears to be explained by its being due to a recessive factor thus causing it to occur in the offspring of normal parents. (Fig. 23). Nettle-

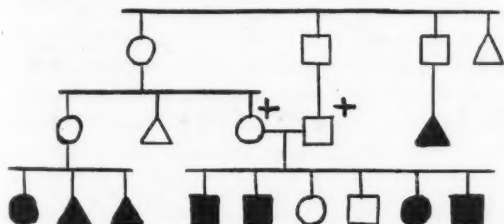


FIG. 23.—Pedigree of day-blindness, showing the recessive mode of inheritance. The parents who are started in the second generation are first cousins both coming from the stock in which the defect runs. Triangles indicate sex unknown. After Nettleship.²¹

ship finds quite a number of consanguineous marriages as the probable explanation of the appearance of this defect in the children. It is apparently not a true blindness in daylight, as its counterpart is at night, but merely an ability to read or see best in dim lights. Mental defects seemed to be quite frequent in the subjects exhibiting this condition and in their collaterals. In view of the accompanying colour blindness, dimness of vision, other ocular defects and tendency to mental deficiency in these families, it would be better for those afflicted to refrain from reproducing, and for parents, who have produced one such child, to have no more.

AMAUROTIC FAMILY IDIOCY

This affection is rare, and fortunately does not leave its victims to be a burden to either themselves or the community. Involving the central nervous system extensively so that the infant becomes blind, paralyzed and mentally abnormal, this disease has shown such a predilection for children of the Jewish race that there has been a tendency to question the accuracy of the diagnosis, when the condition has been reported occurring in infants not of Hebrew extraction. This point will be dealt with shortly, after the mode of transmission of the disease has been discussed.

Although a rather large number of cases of amaurotic family idiocy have been reported, only a few of those will be mentioned here, in which more than one child in the family was involved. While the other cases are as truly hereditary as are those in which more than one child is defective, they are omitted here merely because they give no evidence of their being inherited.

Families have been reported in which two children have died in infancy due to this con-

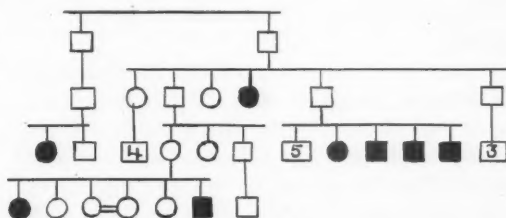


FIG. 24.—Pedigree of amaurotic family idiocy, showing the recessive mode of inheritance. This pedigree is rather unusual in that it shows so many branches of the family affected. Note that it occurs in a child, in her brother's children, in a second brother's grandchildren, and in a cousin's child. After Hermann.¹¹

dition; Carlyll and Mott⁴ have recorded two such families, Poynton²⁵ and Wadsworth³¹ each one, and Weber³² has recorded a family in which three of the children died of it. In Fig. 24, is given the pedigree of a family reported by Hermann¹¹ in which this defect appeared in three generations in collateral lines, for, of course, there is never a case of direct inheritance from parent to child, in this disease. It appears to be due to a recessive factor, so that two normal parents, both of whom carry the factor latent may produce offspring who show the disease, just as in Mating VI,¹⁵ we found that two brown-eyed parents could produce a blue-eyed child.

As stated above, the disease is found almost exclusively in the children of Jewish parents and most frequently in those from Russia. What is the explanation? Is it a racial characteristic; and is it impossible to find it in the offspring of Gentiles? * The probable explanation for the greater frequency among the Jewish people is this: the disease is very rare, so that the chances of two people mating, both of whom carried this recessive factor, are very small. The Jewish race is one that is segregated and apart; intermarriage with the population at large is unusual, so that similar characteristics are much more apt to be met with in two Jewish mates than in two people from the general population. Moreover, many of the cases are found in families in which the parents are known to be related, thus materially increasing the chances of mating two similar characters, and most of the other cases are in children whose parents come from districts in Russia, where because of racial, and geographical isolation, there is much inbreeding, so that the parents have a common ancestor very frequently, although unaware of the relationship. This probably accounts for the preponderance of the cases in Jewish children.

Since the children who exhibit the disease die in infancy, should we educate the parents who have produced one child with amaurotic family idiocy to refrain from producing more, or should they be left to propagate, for the sake of the normal children which may be born to them? The history of the family in Fig. 24, justifies us in

saying that although they may produce normal children, they may have passed on to them the capacity to procreate these abnormal offspring who must in their turn die, and that, rather than permit the waste of life to go on through generation after generation, the parents who first find themselves the bearers of this tragic potentiality, should refrain from passing it on to any more offspring. In time, the persons who have this condition latent would die out, and leave no trace behind them of this disease.

MACULO-CEREBRAL DEGENERATION

This disease appears to be closely allied to amaurotic family idiocy, with the difference that it usually begins between seven and twelve years of age, and is not uniformly fatal as is the more infantile form. It appears to be inherited, and to be due to a recessive factor, so that several offspring in one family are affected, although the parents are normal as a rule. Due to the fact that it does not always result in death, it is possible that some persons reach maturity and reproduce. Another point of differentiation between this and the allied condition is that although the latter occurs almost exclusively in Jews, macular degeneration is found in Gentiles as well.

Nardin,¹⁸ and Gifford⁷ have found families in which five children were affected with blindness and cerebral degeneration, and Gifford reports in addition other pedigrees of this disease; two, in which two were affected; four, in which three were affected; and one, in which four were affected. Alkio¹ and Lutz⁵ cite histories of families in which four children were affected, Feingold,⁶ Taft and Munroe,²⁹ and Nettleship²⁰ in three different families, cite instances in which

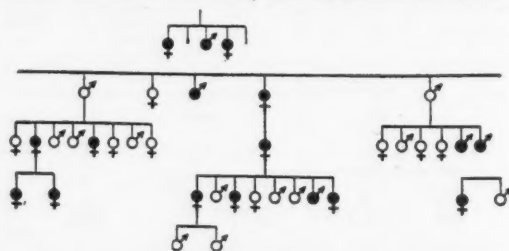


FIG. 25.—Pedigree of cerebral and macular degeneration. Although the disease was transmitted in this family through four generations as if it were due to a dominant factor, two persons free from it passed it on. In view of the evidence furnished by other family trees, we may say that in this family also, it was due to a recessive factor. After Behr, (cited by Clausen).

* Cases have been reported of the disease in Gentiles, mention having been made of some of these by Ledbetter in *Canad. M. Ass. J.*, 1925, xv, 367.

three were affected, and Batten,² Hine,¹² Gordon⁸ and Lewina,¹³ families in which two were diseased. Oatman,²⁴ in addition to giving pedigrees of his own, reviews the literature rather extensively, mentioning many cases reported by other authors.

The most extensive pedigree of this condition that I have found reported is that given by Behr (cited by Clausen⁵). In this family (Fig. 25) there seem to be too many affected for the defect to be dependent merely upon a single recessive character, although such an assumption would explain it. It would mean, however, that the mate in each of the six marriages resulting in defective offspring would of necessity be a carrier of the defect, although latent. This would be rather unusual, unless there were a number of consanguineous marriages in this family, for the disease is not particularly common. Although it may be unsafe to say that it is due to a recessive factor, from a review of the cases reported there seems little doubt that it is inherited, and we may say that it *probably* is the result of a lack of the dominant factor for normal growth of the nervous system.

In this disease and in amaurotic family idiocy the degeneration does not begin until some time after birth, the individuals being apparently normal up to the time that they begin to show deterioration. Pusey²⁶ has suggested that the cause of family degeneration of the macula lutea beginning in childhood or at adolescence may be an inherent defect in the cardio-vascular system, because in one of the families described by him the appearance of the macula was comparable to that seen in elderly arterio-sclerotic people. Moreover, there was a definite history of angina pectoris in this family. The mother and the first, second, third, fifth and sixth child had angina pectoris. The first, third, fifth, sixth and seventh showed macular degeneration. Thus the mother and the second child exhibited angina pectoris, but not macular changes, while the seventh child showed the latter, but did not suffer from cardiac angina. Four members showed both conditions. Since this is the only family which I have found reported in which the two changes were associated, it is probable that they do not have the relation of cause and effect as suggested by Pusey, but that they were inherited as separate

characteristics, just as a certain type of eye colour and musical ability may be met with in one family, but not in hundreds of others, inasmuch as there is no reciprocal relation between the two.

Certainly, persons suffering from this defect, should they live to the marriageable age, ought not to reproduce, and as soon as the defect appears in any of the children of a family, the parents should have no more offspring. The most desirable thing for those children whose brothers or sisters are affected is to refrain from rearing a family, even though they themselves are normal. They may be affected somewhat later in life, or their children may exhibit the condition, and it is too serious a one to be lightly passed on from generation to generation.

Coloboma of the macula has been reported by Clausen⁵ as occurring in a father and son, and he mentions the two cases recorded by Schott in two sisters. Clausen states that it is not clear whether the condition is inherited, and if it is, just what the mode of transmission is. It would not be unreasonable to suppose that defect in the macula is comparable to defect in the retina, choroid, iris or lens, and that it is due to the same embryological cause, namely failure of the optic foetal fissure to close completely. More pedigrees and more research as to its pathology will have to be forthcoming before we can definitely say that it is inherited, and that it is due to a dominant factor as the other types of colobomata appear to be.

GLIOMA OF THE RETINA

Even more tragic in its consequences than the conditions just discussed, is glioma of the retina, a disease also due to a recessive factor, in which two persons with normal eyes may have children who exhibit this defect. Unlike amaurotic family idiocy which kills the patient in infancy, retinal glioma kills its victim if not removed, but leaves him total blindness in exchange for the gift of life, and offers him that exchange at an age so young that he remains a burden to himself and his family for practically an entire life-time. True, the glioma may affect only one eye, thus leaving partial vision, but there is always the possibility that the other eye may be involved at a later date, or if it escape, that the children born to this person will have both eyes affected.

Several families reported by Griffith,^{9,10} substantiated this. A mother who in childhood had had one eye removed for glioma of the retina, gave birth to six children, four of whom developed glioma in both eyes. The other two children were normal. In Fig. 26 both grandmother and mother had unilateral glioma, but in the four children it was bilateral.

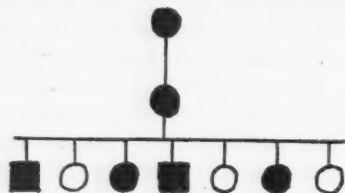


FIG. 26.—Pedigree showing inheritance of glioma of the retina. Although this chart would seem to indicate that it is a dominant character, the weight of evidence is that its mode of transmission is comparable to blue eye-colour, that is, it is recessive. The grandmother, and mother had glioma in one eye only, the four grandchildren had bilateral retinal glioma. After Griffith.¹⁰

To those who doubt the influence that inheritance has in the development of tumours, a survey of the literature on glioma of the retina should prove enlightening. Because most cancerous growths do not develop until about the fourth decade, and because so many of them are situated internally so that an absolute diagnosis can only be made at autopsy, or operation, it is not so easy to trace the inheritance of malignant growths as it might be. In the case of retinal glioma, it usually kills or blinds before the seventh year, and microscopic evidence is much more readily obtainable, due to the number of cases operated upon, than in more remotely situated tumours.

Clausen⁵ has collected the following statistics from the literature, with respect to inheritance in retinal glioma.

Certainly a perusal of Table III must convince the reader that this tumour, relatively rare in the population at large, does not occur by chance in so many children of the same family. The only way that such a disease can be eliminated is for parents, who have produced one child with glioma of the retina, to have no more offspring, and for those who have suffered enucleation of one or both eyes for this condition, to refrain from reproducing.

Thus of the affections of the retina discussed in this paper, the least harmful are

TABLE III

Author	Number of children	Number of affected children
Newton	16	10
Thompson ³⁰	14	5
Calderini	14	3
Leber	9	3
Wilson	8	8
v. Graefe	6	2
Marshall	6	3
McGregor ¹⁷	5	3
Cirincione-Calderaro	5	4
Schönemann	3	2
Valenti	3	2
Fuchs	3	2
Sneli ²⁷	3	2
Snell ²⁷	2	2
v. Hoffmann	3	2
Steinhaus	2	2
Owen	2	2
Sichel	4	4
Griffith	7	4
Griffith	4	3
Griffith	6	4
Griffith	3	3
Boyd	5	3
Comas	11	5

Table showing occurrence of retinal glioma in families. The cases reported by Griffith, Boyd and Comas have been added to Clausen's original list by the author.

night and day blindness, and even these are deleterious in their effects, especially in some individuals. Persons so afflicted should consider carefully the handicaps to which they subject their children before passing on such defects. Amaurotic family idiocy, macular degeneration, coloboma of the macula, and glioma of the retina are so tragic in their consequences both for the person afflicted and for the community which has to provide institutional care for the victims, that both profession and public alike should be alive to the desirability of preventing an increase in the numbers of these unfortunate beings who are robbed of what ought to be the inalienable birthright of all—the right to be normal.

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Prevention of Anorexia in Children.—The plan of prevention of anorexia in children by C. A. Aldrich, Winnetka, Ill., consists first of all, in instructing mothers and nurses as to the nature of anorexia while their babies were young, at 2 or 3 months of age. They were emphatically told never to urge their children to eat except under express orders, and were asked to report refusal just as they would report vomiting or loose stools. Treatment of the first attack always consisted in a reduction of food. It should be taught that anorexia is usually the first symptom of infection and that it precedes all other signs of the common cold. Therefore, when a baby first refused its bottle the mother was told to reduce the feedings and to look out for an illness. Since it was soon found that many cases had their beginning at the weaning period, prevention of weaning difficulties became important. To this end, all babies were given an occasional bottle from birth, often enough so that they remembered the bottle as a friend. This practically eliminated difficulty in getting babies to take bottle food. Since it was often difficult to get babies to make such marked changes as from cereal to vegetable, these variations were made gradually and mothers were instructed not to force new food on them. Cod liver oil and orange juice were given from the first few weeks of life to avoid later struggles. All babies were put on the minimal diet which would cause a satisfactory gain in weight. After the first year, diet lists were given but parents were told to allow the child's appetite to be the sole judge as to the amount of food to be taken. No caloric diets were prescribed. Mothers were told to leave their children alone at mealtime as much as possible and not to talk about eating. They were told to try to develop a detached attitude toward the child at meal time and never to force food. The child's appetite was given the choice of food. It was not considered advisable to "make the child eat everything so that later on he would like everything." Parents were instructed that nothing could be worse for appetites than pitched battles over meals. When the child was about 1 year of age, all parents were asked to begin

reading books on child psychology, and a list of some of these was recommended. Nourishment between meals was not advised for any child. The results of such prophylactic treatment, as shown by statistics obtained in 199 consecutive cases, demonstrate that (a) in this series it was not harmful to the nutrition of the children to advise strongly against forced feeding, as the group averaged 3.6 pounds above weight for age, and (b) there were no children in this group who were malnourished except those suffering from physical disease.—*J. Am. M. Ass.*, Sept. 17, 1927.

Sir Arthur Keith was able to announce on Tuesday last to the British Association that, in answer to his appeal to the public for the preservation of Downe House, the home of Darwin, he had received a telegram from Mr. Buckston Browne making himself wholly responsible for the national gift. No other contributions will be necessary. Mr. Buckston Browne's offer, which was gratefully accepted by the Association at the closing of its sessions, implies a gift to the nation amounting, with a certain endowment, probably to as much as £14,000 or £15,000; he has made the valuable suggestion that the office of curator of the premises should be given to a suitable medical man.

Liver Cocktail: Liver in Edible Form for Pernicious Anæmia Patient.—An edible liver cocktail is prepared by William Thomas Wilkins, Jr., Piqua, Ohio, as follows: After having scraped the liver it is run through a meat grinder twice, the finest cutter being used, and placed on ice immediately. One-half pound of liver makes four tablespoonfuls of crushed product. Prepare a sauce as follows: Tomato catchup (Heinz), $\frac{1}{2}$ cup; lemon juice, $\frac{1}{4}$ cup; Worcestershire sauce, 2 teaspoonfuls; chives (finely chopped), $\frac{1}{2}$ teaspoonful, and salt and pepper, to taste. Mix the liver and sauce in the proportion of one part crushed liver to two and a half parts of sauce. Chill thoroughly and serve in a cocktail glass with salt crackers or wafers.—*J. Am. M. Ass.*, Sept. 17, 1927.

Case Reports

SEPTICO-PYÆMIA IN YOUNG CHILDREN*

By W. L. DENNEY, M.D.

London, Ont.

The symptomatology of an acute attack of septico-pyæmia as usually seen in the adult has been well described by Taylor.¹ "There is a sudden onset with a prolonged rigor, followed by profuse sweating and collapse; the temperature rises, and fever continues to be interrupted by fresh rigors daily, or even two or three in one day, but often without any regularity. There are anorexia, thirst and dry tongue; anxiety; prostration, rapid breathing and loss of flesh. The face is usually sallow, or even distinctly jaundiced, and the urine may contain some bile pigment. Sickness is not infrequent and diarrhoea may be present. Leucocytosis is marked. The rigors may cease after five or six days, but fever of an intermittent or remittent type continues; occasionally there are transient erythematous patches in various parts of the body. The further symptomatology varies with the local lesions."

Bothe² described the more chronic form of this condition as occurring with a positive blood culture, fever and a leucocytosis. Most of his cases gave evidence of nephritis.

CASE 1

M. H., female, aged 3, was admitted to the Children's Memorial Hospital on January 23, 1922, with a history of sweats, loss of weight, anorexia, and a limp. The Pirquet test being positive, a provisional diagnosis of tuberculosis of the left hip joint was made. Late in February, pus was discharged from the left ear, but no fever was noted until March 7th, when the temperature rose to 104° F. coincident with redness and swelling over the mastoid region, and a leucocyte count of 23,000 was observed. A radical mastoid operation was performed the next day. From March 9th to 13th, the temperature ranged between 102° and 103°. On March

13th, an erysipeloid area accompanied by much œdema appeared about the left ear, lasting forty-eight hours. For the next month, the daily temperature ranged from 99° to 104°. On March 18th, a diffuse pneumonic area appeared in the upper lobe of the right lung, which lasted ten days.

On two occasions, during the course of the fever, distinct erythematous rashes appeared over the limbs and trunk. From March 21st to 26th, purpuric spots appeared on the left arm and trunk. A blood culture, taken on March 23rd showed *S. aureus*. Two days later vomiting developed followed by jaundice which persisted for two weeks. Later, pain was felt over the right mastoid process, with a fever of 105° F.; this lasted two days when the symptoms disappeared spontaneously.

Three years after leaving the hospital, she is in good health although the left hip is ankylosed.

CASE 2

W. H. G., male, aged one year, was admitted to the Children's Memorial Hospital August 28, 1923. The parents stated that for the past three months, he had been having sweats several times a day. Progressive weakness and loss of weight were evident during that time. The skin appeared to be itchy, preventing the child from sleeping. Several teeth that had erupted showed a necrotic margin in the surrounding gum. The father gave a history of luetic infection. There were three older children, living and apparently healthy.

On admission, the child had a malnourished appearance, and weighed 17 pounds. The skin showed much evidence of scratching. The hands and feet were swollen and red with ulcerated areas on the great toes. The temperature was 101° and the Wassermann test was positive. Two separate blood cultures gave pure growths of *S. aureus*. A third culture taken one month later also showed the same organism.

For one year after admission, the child's temperature ran an irregular course, varying between 99° and 102°. At times the temperature would reach 105°. From August until the following February his weight irregularly de-

* Read at the Monthly Conference of the Department of Pediatrics, University of Western Ontario.

clined until at that time he weighed but slightly over 14 pounds. The skin hung in folds upon the skeleton; the face was almost cadaverous. Ulcers with undermined edges appeared from time to time over the body, chiefly in the region of the back and buttocks. Huge necrotic areas sloughed out. Cultures from these abscesses invariably yielded *S. aureus*.

About the end of February, his weight began slowly to increase, until on discharge from the hospital in July, 1924, he weighed 22 pounds; the temperature was still elevated; sweats were of frequent occurrence, and the palms and soles were still sore and itchy. His general condition, however, appeared to be much improved. Two blood cultures were sterile.

At times during the course of the disease, there was a small amount of albumen in the urine, with some pus cells and a few casts. The leucocyte count varied from 11,000 to 13,000.

For five months after admission the child was treated with grey powder; potassium iodide was also given at intervals. Drug treatment was then discontinued for two months and, because the skin was in poor condition, he was placed under radiant heat. Nine months later, he was given a series of autogenous vaccines. This seemed to have little or no effect. In March, 1924, mercury was again administered. In June, in spite of the fever, he was given a series of eight neo-diarsenol injections intravenously.

After discharge from the hospital, he was treated with cod liver oil and malt, but no further specific therapy was given. The condition gradually improved, until in about three months the temperature was normal, sweating had stopped and the hands and feet, although still somewhat swollen, were greatly improved.

He returned in April, 1925, for examination. At that time his blood culture was sterile, the blood Wassermann negative, and the cerebrospinal fluid normal in all respects.

These two cases are illustrative of staphylococci septicopyemia in very young children. Both are peculiar in that they were superimposed on a primary chronic infection—tuberculosis in the one case, and syphilis in the other. With the exception of the mastoiditis in the first case, neither developed a migrating osteomyelitis, as we might naturally have expected. Neither case developed any demonstrable cardiac lesion or a severe nephritis.

Most of the cases with positive blood cultures are in older children, who seem more liable to develop these complications.

In the second case, it is interesting to note that in spite of the continuation of the original symptoms, the natural resistance to the organism had so increased that the child was able to increase in weight and greatly improve in appearance.

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A CASE OF ACUTE DUODENAL ILEUS FOLLOWING NEPHRECTOMY, LASTING EIGHT DAYS WITH RECOVERY*

By S. A. WALLACE, M.D., F.R.C.S. (EDIN.)

Kamloops, B.C.

Patient Mrs. E., aged 35, housewife, complained chiefly of frequent and painful micturition; at times voiding every one-half hour. She had been operated on for an appendicular abscess eight years ago and for an ischio-rectal abscess one year ago. She was emaciated and anæmic and showed signs of general enteropitosis. The right kidney was easily felt and appeared nodular.

Cystoscopic examination showed a typical golf-hole, right ureteric orifice from which purulent urine was drained; left ureteric orifice was normal, and clear urine was obtained on catheterization which gave over 2 per cent urea. No tubercle bacilli were found in urine. Pyelograms showed eroded calyces.

Operation and after history.—On May 15th, a right nephrectomy was performed; and a tubercular kidney found. The operation went very smoothly, and was all finished in thirty minutes. For the first twenty-four hours after operation the patient's condition was quite good, but on the second morning she vomited large quantities of dark green fluid. The abdomen was markedly distended and the stomach could be outlined down to the hypogastric region and well below the umbilicus. Stomach lavage was performed and three pints

* This case is reported with the consent and the assistance of Dr. R. W. Irving.

of dark green fluid withdrawn, after which the abdomen was quite flat. Eserine and pituitrin were given every four hours and fluids were administered per rectum.

On May 18th, the abdomen was again distended and the patient was vomiting continuously. Lavage was performed morning and afternoon and on each occasion about three pints of greenish fluid removed. An ounce of magnesium sulphate in solution was left in the stomach, and eserine and pituitrin and strychnine, were given alternately. Some peristaltic waves were seen crossing the stomach before it was emptied. It was now thought we were dealing with a case of duodenal ileus instead of an acute dilatation of the stomach from atony.

On May 19th, and 20th, the stomach became filled as before, a few hours after each lavage it became distended, and splashing was easily detected and occasionally peristaltic waves were seen. The patient was now turned on her right side, and her face and the foot of the bed elevated, and after lavage eserine, gr. 1/100 and pituitrin $\frac{1}{2}$ c.c. were given hourly for four doses, twice daily. Only a slight improvement was noticed until May 22nd—seven days after operation—when not quite so much fluid was removed by lavage. The patient had been kept alive by fluids per rectum and intravenously. On the morning of May 23rd, there was some improvement in the general condition, the pulse had slowed down, the patient was not so weak, and the abdomen not so distended. About eighteen ounces of dark green fluid were removed by stomach lavage, but the patient had taken more fluids than this during the night. This was the first time that the stomach had passed any fluid through

the pylorus since the operation; previously many times more fluid was withdrawn by lavage than had been given by mouth. Eserine and pituitrin were given hourly, as before. In the evening the abdomen was quite flat, the stomach, apparently, completely emptying itself for the first time since the operation eight days previously.

From the general visceroptosis present, and from the fact that the patient slowly began to improve after the posture was changed, it was thought that we had here a case of mesenteric ileus. At times peristaltic waves could be seen crossing the stomach, a feature not seen in acute dilatation of the stomach from atony. The latter condition usually follows the higher intra-abdominal operations and generally improves with one or two gastric lavages and pituitrin. This case showed no response to lavage and pituitrin alone, and it was only after the posture was changed and eserine and pituitrin given hourly after the lavages that any improvement was noted. By giving eserine and pituitrin together, the action of both drugs on the gastro-intestinal musculature is much increased. Wilkie, who has made a special study of mesenteric ileus, lays particular stress on visceroptosis as an etiologic factor. The loops of the small bowel lying in the pelvis, drag on the mesenteric artery as it crosses the third part of the duodenum, pinches the bowel here and gives a partial or complete obstruction. This can be relieved posturally, by placing the patient on the right side or on the face and elevating the foot of the bed. The chronic cases obtain almost instant relief with this position. Following abdominal operations the condition is serious and requires instant and thorough treatment.

Treatment of Nervous Indigestion.—The treatment of the functional disorders of digestion is discussed by Walter C. Alvarez, Rochester, Minn., under four headings: (1) psychotherapy and instruction in mental and physical hygiene; (2) physical therapy, exercise and massage; (3) diet and (4) drugs. Before treating a patient for nervous indigestion the physician must be sure that this is the correct diagnosis. Many persons are suffering from organic disease which later becomes apparent; hence it is unfair and unwise to call them un-

pleasant names. A complete examination must be made before the physician is justified in reassuring his patient. Such an examination is one of the best vehicles for psychotherapy. The history must be gone over repeatedly until the physician has gained a thorough understanding of all the factors likely to produce a neurosis. When the condition has been diagnosed, such measures as rest, physical therapy, diet and drugs should be considered in its treatment.—*J. Am. M. Ass.*, Aug. 6, 1927.

Reviews and Retrospects

RECENT ADVANCES IN HÆMATOLOGY

6.—PERNICIOUS ANÆMIA—HÆMOLYTIC OR TOXIC?*

BY EDWARD S. MILLS, M.D., M.Sc.

Montreal

Fresh impetus has been added to the study of pernicious anæmia by the revival of a method for studying the bone-marrow as well as the peripheral blood during the different phases of the disease. The withdrawal of small amounts of bone-marrow for the purpose of microscopic study, by boring into the tibia, was first performed on man by Ghedini of Genoa in 1908. The investigation of pernicious anæmia by means of this method was started by Zadek, and adopted in this country by Peabody, whose observations appear in the May volume of the *American Journal of Pathology*.

Zadek observed that the bone marrow, which is red during the periods of relapse, becomes yellow and fatty during the periods of remission. He also showed that the megalocytosis (large type of red blood cell) which characterizes the blood picture in the relapse, corresponds to an increase of the megaloblasts in the bone marrow.

Peabody has correlated the state of activity of the blood-forming tissue with the findings in the peripheral blood, and the clinical condition of the patient, by examining the marrow obtained in this way at different times during the course of the disease. As a result of his investigation, the prevalent belief that pernicious anæmia is essentially a hæmolytic process—a state of unstable equilibrium in which the destruction of blood exceeds its formation—is challenged.

Seven cases of pernicious anæmia were studied. In five of these seven, biopsy sections of the bone marrow were obtained during a period of remission and again when the disease process was at its height. In the remaining two, no biopsy was performed before the onset of the remission.

The operation of puncturing the tibia was carried out under local anæsthesia by making a longitudinal incision 4 cm. in length, down to the shaft of the tibia. The periosteum was in-

cised, and raised, and a specimen obtained by drilling the bone and removing a small piece of marrow with a bone curette. The wound was closed by skin sutures only. No untoward results were observed in the eighteen drillings carried out, and the discomfort to the patient was not great. The essential features of the investigation may be brought out by quoting from a summary of the findings in the first two cases reported.

CASE 1

At the height of a severe relapse (red blood cells 0.6 millions; hæmoglobin 15 per cent) the bone marrow of the tibia was characterized chiefly by the complete replacement of the fat by myeloid cells, and by the great hyperplasia of the megaloblastic tissue with numerous mitoses. There were numerous normoblasts, but relatively few mature erythrocytes, and the venous sinuses were narrow and compressed. Two months later, just before the onset of a clinical remission (red blood cells 0.8 millions; hæmoglobin 13 per cent) the marrow was in a similar state except for the presence of a few cells containing fat, and a relative increase of normoblasts and mature red blood cells. Ten months after the first examination, during a remission, in which the erythrocyte count was normal, the cellular hyperplasia had almost completely disappeared, and the marrow consisted largely of fat cells. In the small capillary spaces, between some of the fat cells, were many erythrocytes and normoblasts, but the more primitive cells (megaloblasts) were comparatively few in number. The venous sinusoids had become widely distended with blood.

CASE 2

During a severe relapse (red blood cells 0.9 millions; hæmoglobin 24 per cent) the fat of the bone marrow was almost entirely replaced by myeloid cells, and there was a striking hyperplasia of megaloblasts with many of them showing mitoses. Many normoblasts were present, but mature red blood cells were not particularly numerous. Early in the development of a rapid remission (red blood cells 3.5 millions) the bone marrow was characterized by a great increase in fat deposits, and by large numbers of normoblasts and mature erythrocytes, but at this time only a few megaloblasts were observed. The venous sinusoids were much more distended and distinct during the remission than during the relapse.

As indicated by the biopsy sections in these cases, the essential lesion of the bone marrow in pernicious anæmia, and that which dominates the histological picture during a clinical relapse, is a hyperplasia of the myeloid cells in which the megaloblasts play the chief part. The megaloblasts, as shown by Sabin and her co-workers, develop from the endothelial cells of the inter-sinusoidal capillaries, which in an atrophic marrow are collapsed and almost invisible between the fat cells. They are formed within the lumen of a capillary where active proliferation (numerous mitoses) is taking place. The capillary may thus be filled by one, two or more rows

* (1) The Origin of the Red Blood Cell in Adult Marrow, *Canad. M. Ass. J.*, 1926, xvi, 174. (2) Laboratory Aids in the Diagnosis of Anæmia, *Ibid.*, 1926, xvi, 430. (3) The Blood Platelets, *Ibid.*, 1926, xvi, 818. (4) The Value of Splenectomy in Purpura Hæmorrhagica, *Ibid.*, xvi, 937. (5) The Treatment of Anæmia, *Ibid.*, xvii, 709.

of megaloblasts. The rapidity of the process in a very active marrow is indicated by the numerous mitoses, and by the tendency of the cells to remain adherent to one another. Coincident with the hyperplasia of the megaloblasts, there is also a limited development of the more highly differentiated forms of the red cell series, namely erythroblasts, normoblasts, and erythrocytes. During a period of myeloid hyperplasia the fat cells are almost invisible, but they are a constant element in the structure of the marrow, and serve an important subsidiary function by compensating for the proliferation and regression of the true blood-forming cells.

In the first case cited, the bone marrow during a period of relapse was of a very cellular type, the majority of the cells being immature (megaloblasts and normoblasts). Just before a remission began there was a slight increase of fat, indicating a less cellular marrow, with an increase in the more mature cells (normoblasts and erythrocytes). After a complete remission had taken place the marrow was largely fatty. In the second case a striking decrease in the immature type of cells was noted early in the remission.

The findings in the first case suggest that activity of blood formation (especially of the immature type) begins to slow down *before* improvement can be noted in the peripheral blood. In the second case the marrow was becoming fatty and relatively inactive at a time when the peripheral blood was rapidly returning to normal. This is hardly compatible with the assumption that the anæmia is due to increased hæmolytic, because the marrow would presumably remain active until restitution of the circulating erythrocytes was established.

It may be shown in another way that the marrow is functionally less active during the relapse, when it appears so hyperplastic, than during a remission when it is largely fatty. An erythrocyte count of the peripheral blood during a relapse frequently shows about one million cells with 2 per cent of reticulated forms (immature), whereas during remission there may be five million cells with 0.5 per cent reticulocytes. In the former case there are 20,000 reticulocytes per c.mm. of blood, while in the latter there are actually 25,000 in the same volume of blood. This is so, in spite of the fact that the active bone marrow in the patient during a relapse of the disease, is an organ many times larger than that in the normal subject. The extensive hyperplastic marrow delivers fewer young cells in a unit of time than a normal marrow—cellular hyperplasia with functional inefficiency. In this connection it may be pointed out, that in

the very cellular marrow specimens, the venous sinuses were invariably collapsed whereas in the more fatty or inactive ones, these same blood channels were filled with mature red blood cells. Such histological and hæmatological evidence is believed by Peabody to indicate that the megaloblastic hyperplasia of pernicious anæmia produces a bone marrow with diminished functional capacity, and that this type of anæmia is the result of the pathological lesion in the bone marrow. The relapse is thus characterized by a rapid proliferation of primitive cells, and by a diminished tendency towards the differentiation of the more mature forms of the erythrocyte series, while the onset of a remission is marked by a resumption of a more normal process of cell differentiation. The cause of the anæmia would thus appear to be an abnormal type of cell growth, consisting in a development of the primitive megaloblasts, and a failure in the differentiation of the more mature red blood cells which normally are introduced into the peripheral blood. The investigation failed to reveal whether this process is to be regarded as a hyperplasia due to some extraneous toxin, or whether it is similar to a tumour growth.

The bilirubinæmia, which is such a constant feature of pernicious anæmia, and which has been used as an index of blood destruction, is explained by Peabody on the basis of normal production with accumulation in the blood stream, due to lack of utilization when the marrow is functionally inefficient. In this connection, it is pertinent to note that in that most definite type of hæmolytic disease, congenital hæmolytic jaundice, in which the amount of bilirubin in the plasma is many times greater than it is in pernicious anæmia, the bone marrow continues to deliver sufficient cells to maintain a moderate erythrocyte count for years. This is used by Peabody as an additional argument in favour of the toxic origin of the disease.

Any such explanation of the bilirubinæmia is, however, pure speculation. The importance of Prof. Peabody's communication lies in the lucid and accurate picture which he has drawn of the bone marrow in pernicious anæmia, both in the stage of activity and in the latent period when the process is relatively quiescent. He has also correlated this picture with that which is more familiar to us, namely the findings in the peripheral blood. The conclusions which he has drawn from his study should be given careful consideration and the study of the disease taken up afresh with the old concepts *en délibère*, and the clinical mind free to interpret fresh evidence as it may present itself.

Editorial

CONCERNING OLD AGE

OF late there has been a good deal written concerning old age and, as we are all growing older, even the youngest of us, it is a subject that never loses interest. In a recent paper appearing in *Nature*, Sir Humphrey Rolleston¹ discusses some of the facts regarding life and old age from a scientific standpoint. Biologists have shown that the simple unicellular forms of animal life are, accidents apart, immortal. By cultural experiments it has been demonstrated that the individual cells of man's body are also potentially immortal. But the necessary conditions for indefinite life cannot apparently be realized when these cells form part of a highly specialized and differentiated complex whole. Such important factors as alteration in diet and, the endocrine balance as it affects growth and metabolism must be taken into account.

Dismissing Biblical and other early claims of patriarchal longevity as existing only in the minds of later scribes, Sir Humphrey states that the physiological age of man may still be taken as one hundred years, though few reach it. The reason for death has been much debated. One conception holds the physiological termination of life to be inherent in our constitution and determined in great measure by heredity, and the constituent cells in each individual to be endowed with a certain store of vitality for themselves and their descendants, and as this store runs out the process of involution begins. Another view, suggested by the cell culture experiments, is, that in old organisms a substance is produced in the ageing cells which enters the blood and exerts an inhibitory action on the life and reproductive power of the tissue cells.

Of the factors influencing longevity *inheritance* is, undoubtedly, the most important. The vitality of the nervous and

vascular systems which we inherit determines to a large degree the length of life. Of *environmental factors* the influence of long continued infection or intoxication appears to be more serious than that of an acute illness. *Functional activity*, mental and physical, plays a great part in keeping the body, when free from disease, trim and slim and in postponing the advent of morbid old age. In Sir James Crichton-Browne's words, "the best antidote against senile decay is an active interest in human affairs, and those keep young longest who love most." In regard to *food* it is generally agreed that moderation is essential to long life,—a simple diet throughout life, and, after growth is completed, a strict obedience to the rule of avoiding all excess and of never eating to repletion. While excessive use of *alcohol* is undoubtedly harmful, Raymond Pearl with all a modern statistician's precautions against fallacies gives the perhaps not unwelcome verdict that "a moderate use of alcohol does not tend to shorten life." But in defining "moderate" the personal equation of the individual must weigh heavily. *Tobacco* smoking has not been proved to be a cause of arterio-sclerosis in man, and it is possible that, as in many people smoking diminishes appetite, a beneficial influence may be exerted by preventing over-eating.

The advice to be given to others, and to be practised by ourselves, provided that fate has bestowed upon us a judicious choice in our parents, should include the following: avoidance of disease and worry, moderation in all things, mental and physical exercise, an open-air life, serenity and charity to all men.

From the statistical point of view, Professor Irving Fisher², of Yale University, compares the present status of longevity with estimates made by him in 1909, and discusses future possibilities.

1. Concerning Old Age. A discourse delivered at the Royal Institution, May 13, 1927, by Sir Humphrey Rolleston, Bart.

2. Lengthening of Human Life in Retrospect and Prospect. An address read to the American Public Health Association, Oct., 1926.

In 1909 it was estimated that by the application of the then existing knowledge of hygiene and preventive medicine, fifteen years could be added to the human lease of life. This prophecy is shown to have been fulfilled in almost every particular. Tuberculosis has declined materially; typhoid fever and diphtheria have been reduced by 87.5 and 44 per cent respectively; accidents in large manufacturing plants have been reduced by 60 per cent, but automobile accidents have increased greatly; infant mortality has also diminished by 60 per cent.

With the advance in scientific medicine, and its influence in preventing disease and changing habits, human life has lengthened rapidly. In the 17th and 18th centuries in Europe the rate was four years per century; in the first three quarters of the 19th century it was nine years; in the last quarter it rose to seventeen years; and finally, in the first quarter of the 20th century, the rate was forty years per century for England, Germany and the United States. The question naturally arises,—how long can we go on extending human life? Professor Fisher states that if we assume one hundred years as the natural limit, the average duration of life in 1950 will be sixty-nine years, in 2000 eighty-two, in 2400 ninety-nine, remaining from then on between ninety-nine and one hundred, always approaching closer to the unattainable limit.

In order to maintain the present rate of increase it is necessary to apply more and more thoroughly the existing knowledge of hygiene and preventive medicine. Professor Fisher stresses the great benefits to be derived from periodical health examinations with the opportunity given thereby for instruction in personal hygiene and better habits of living, and for the early diagnosis of disease.

Can we exceed one hundred years? Professor Fisher thinks that it is possible, and bases his belief on the diminishing mortality

rates in the upper ages, the more efficient removal of deleterious influences in our environment, the increase in authentic cases of long life and the biological proof of cell immortality.

A layman's thoughts on old age are presented by the English essayist, Robert Lynd, writing on his forty-eighth birthday³. On the whole, he states, one does not feel as old at forty-eight, as, when one was twenty, one expected to feel. There has been no increase in wisdom, no conquest of fear, indolence and selfishness, to make life at forty-eight different from life at eighteen,—one grows old only in years. The truth is, one remains what one always was, and is shamefully content merely to be alive.

Mr. Lynd is unable to understand why women object to growing old. Happiness does not consist in being young and, though disease and the loss of faculties and the loss of friends bring misery, there is no absolute misery in being old. Certainly, if aspirations are an aid to happiness, one can be as happy at fifty as at twenty.

The chief objection to growing old, Mr. Lynd thinks, is not that one grows old oneself, but that the world grows older, and it is not so much that the world grows older as that the world we once knew is in ruins. However, at any age it is on the whole better to be alive than dead. "I myself, if I could keep a few friends with me and could survive without losing my wits or my power of movement, would gladly live till over a hundred."

Thus science is attempting to put on an immortality of the flesh, and one wonders if the promised extension of life will also bring an extension in man's period of creative activity. Future generations may require a revision of Osler's dictum that man should rest from his labours at sixty.

C. J. TIDMARSH

3. Crabbed Age. An essay by Robert Lynd. The New Statesman, April 23, 1927.

DIGITALIZATION—A PLEA FOR CAUTION

AN editorial in a recent number of the Journal of the American Medical Association makes a very sane comment on the growing tendency to use digitalis in

"massive dosage." By many the introduction of any mathematical formula at once suggests an exact routine to be followed in all cases of a given disorder. Perhaps, therefore,

a word of warning will not be out of place concerning the indiscriminate use of such a method in prescribing a drug so capable of harm as well as of good, as is digitalis. After all, there are contra-indications as well as indications for the use of digitalis and these contra-indications are not always of an easily recognized character. For this reason, a few comments on the routine practice of digitalization in its modern sense may be of value.

The saturation method of dosage has been employed extensively in the treatment of auricular fibrillation and a group of clinicians also employ the method in the treatment of pneumonia. This rapid saturation method depends on the so-called cumulative action of digitalis. The drug is removed from the body at a definite rate, and if it is administered more rapidly than it can be excreted, there is a piling-up of the drug in the system with the development of symptoms of poisoning. In the past, this stage of saturation or mild poisoning was not desired, and the drug was immediately stopped when symptoms of accumulation developed. With the use of massive dosage, constant care is required to avoid a dangerous over-stepping of the margin of safety.

Indeed, not infrequently, in serious heart conditions and in serious illness such as pneumonia, digitalis thus employed in cumulative effect may have hastened or, perhaps, caused death.

A primary symptom of beginning digitalization is headache or a feeling of fulness or tightness in the head. When this symptom is well in evidence digitalis was in the past generally stopped by the therapist. Complete digitalization will cause nausea, vomiting, complete loss of appetite for days, disturbance of vision, and generally a diminished secretion of urine, although in the early stages of this heavy administration of digitalis the excretion of urine may be increased. With digitalization the pulse should be slowed. Unfortunately it sometimes becomes irregular both in volume and rate; even heart block may occur. The vomiting, while partially due to a slight irritant action of the drug on the stomach, would appear to be chiefly due to a reflex from the nerve centres, and in part to the intrinsic action of the drug on the heart.

These facts should be clearly remembered by the physician when he undertakes to administer digitalis in these large doses.

Clinicians are divided as to the value of digitalis in pneumonia, but all are agreed that such treatment should be given in the first days of pneumonia or not at all. Those who advocate its employment in the early stages believe that it protects the heart throughout its severe trial. There can be no question of the value of digitalis in ordinary doses in cases of pneumonia with prune juice expectoration, but whether the massive doses necessary for digitalization are indicated in all such cases, is a subject for discussion.

Investigations both in the laboratory and at the bedside have indicated that the amount of digitalis required to produce its full action is a minimum of $22\frac{1}{2}$ grains and a maximum of 33 grains for an adult of 150 pounds in weight. Half the minimum dose may be given at once, and followed by 2 to 3 grains every six hours; or the other half of the minimum dose may be given on the second day. If the patient needs more for the development of digitalization the amount may be gradually increased by two or three grains every four or six hours until the awaited symptoms appear. These symptoms are dependent on the inability of the system to excrete digitalis as fast as it is being ingested and will therefore last for several days until the major part of the drug has been excreted. Some digitalis, however, will remain in the system for from one to two weeks, during which time extra doses will prolong the tonic symptoms.

Digitalization should not be attempted, if the patient has previously been taking digitalis, as toxic symptoms may be rapidly induced. The dosage advised must be estimated on weight, and must of course be greatly modified in the case of frail, underweight persons. When the body weight is largely due to fat, allowance must be made for this inactive tissue, and the dose must be distinctly lessened and not estimated by the total body weight. Any condition either in the kidneys, or in the liver that would interfere with its elimination must be given special consideration, and the dose definitely lessened.

It must ever be remembered that digitalization means digitalis poisoning, and that

administration of the drug in these large doses should never be inaugurated except after very careful consideration of the exact condition of the patient to be treated. It is questionable how far it would be wise for the general practitioner to administer these full doses unless he has facilities for de-

termining the exact condition of the heart and the excretory ability of the kidneys. In not a few cases neither the heart muscle nor coronary circulation will be found able to withstand such treatment without the development of dangerous symptoms not easily combated.

ON POLIOMYELITIS

IN our June issue we referred* in an editorial to an address on poliomyelitis, by Professor James Collier. In a recent number of the British Medical Journal, Dr. Walshe, physician in charge of the Neurological Department of University College Hospital, takes issue with many of the statements made in that address. Poliomyelitis, in Dr. Walshe's opinion, must be regarded as an acute specific fever which in its complete expression presents three distinct clinical and pathological phases. Clinically, these are a short-lived initial phase of constitutional disturbance, followed by signs of invasion of the subarachnoid space, and finally by signs of involvement of the nervous tissue itself. Each of these phases has its pathological substratum. In the initial phase, the virus appears to obtain lodgment in the liver, spleen and lymphatic structures generally, in all of which lesions are found. The virus then reaches the subarachnoid space, and leptomeninges, and gives rise to a reaction manifested by changes in the cerebro-spinal fluid. Finally, it invades the nervous tissue and produces there the inflammatory lesions to which the paralysis is due. The intensity of each phase varies, as do also the time relations of the first two phases. Furthermore, the infection may die out after the first or after the second phase, thus giving rise to so-called abortive cases. When it dies out after a severe meningeal reaction, it is spoken of as belonging to the meningitic type of the disease.

The initial phase of poliomyelitis seldom presents sufficiently characteristic symptoms for identification, and may be so mild that the patient continues to go about, and thus has ample opportunities of spreading in-

fection. Like other infectious diseases poliomyelitis has its own seasonal and age incidence, incubation period, and mode of spread. It has been generally held that the infection is carried and spread both by healthy carriers of the virus, and by those actually suffering from the disease. From the naso-pharynx of both groups of individuals a virus has been obtained capable of producing the disease in inoculated monkeys, and Flexner and Amoss concluded that the naso-pharyngeal mucosa, during the ten days immediately following the initial sign of infection, regularly contains the virus. Collier stated that he considers the disease is spread almost exclusively by the agency of healthy carriers, and that actual sufferers from the disease appear to be non-infective to contacts owing to loss of virulence in the infecting agent. Since this hypothesis has to do with vitally important questions connected with public health, it is essential that the data on which it is based should be carefully studied. The categorical statement that those suffering from the disease cease to be infective may be summarily dismissed, for it has been established by Flexner and Amoss that the naso-pharyngeal secretions within the first ten days after the onset of the disease contain a virus not less infective to the monkey, than is that of a healthy carrier; and throughout the whole range of infective agents pathogenic to man there is no parallel of the state of affairs thus alleged by Collier for the virus of poliomyelitis.

It is undoubtedly more difficult to establish unequivocally the occurrence of case to case infection. In referring to the literature for examples of such infection, Walshe considers it desirable to go direct to original sources, in which all facts as observed are recorded irrespective of their possible bearing upon

* *Canad. M. Ass. J.*, June, 1927, xvii, 716.

any discussed question. For this reason he turns to Wickham's original monograph on the Swedish epidemic of 1905. Wickham concluded upon evidence, which left him no alternative, that poliomyelitis tends to spread along the lines of human traffic. It must therefore have been borne by healthy carriers, or by carriers suffering from the disease in its initial phase, or in its abortive form. Among the numerous foci of the disease analysed by him, those in the parish of Trästena, and on the islands of Sirko and Borgo, provide clear examples of a state of affairs incapable of explanation except by case to case infection. The village of Trästena was a remote woodland village of some five hundred inhabitants living in 119 houses. Forty-nine cases of poliomyelitis occurred in nineteen houses, the first case developing on June 28th, and the last thirty-seven days later. The maximum number of cases developing on any single day was four. Multiple cases in households were the rule, occurring in no fewer than thirteen out of the nineteen infected houses. The maximum number of cases in a single house was five. In the first eight households infected, the initial case was a child attending school. The school was infected by the first case in the village, and the school house was the second household involved; four of the schoolmaster's children developing the disease. From this point household after household became infected. In nearly every instance an incubation period of three days or over intervened between the appearance of the successive cases within a household. The school was closed on the 15th of the month and after that the epidemic rapidly declined. Collier himself quotes an outbreak of poliomyelitis in the Devon village of Stokes Rivers. This village contained 119 inhabitants living in eighteen houses. There were reported thirty-six cases of the disease occurring in fourteen houses. Four houses containing eight children escaped entirely. Multiple cases occurred in eleven of the fourteen infected households. In one house nine cases occurred during a period of twenty-two days, with a definite incubation period between the onset of each.

Burroughs and Parke have analysed a small outbreak in a block of flats in an

American city which provides further evidence of the important rôle case to case infection plays in epidemic poliomyelitis. Collier's theory of the carrier epidemic, and the exclusive infectivity of the healthy carrier falls to the ground, and his advice that a community in which poliomyelitis has appeared should be kept together is dangerous to every member of that community.

The question has also been approached from another point of view by Aycock and Eaton, who after a comparative study of the incubation periods of infectious disease find that in each disease, incubation periods fall into two distinct groups, a short and a long. The former indicates simultaneous infection from a common source. The latter indicates true secondary case to case infection. Although true secondary cases of poliomyelitis appear to be less common than those of other infectious diseases, their occurrence is undoubted.

Regarding the question of the carriage and spread of the disease by other means than human carriers, Aycock came to the conclusion, from an analysis of a large series of cases, that transference by human contact alone appears inadequate to account for some of the features of an epidemic of poliomyelitis, and he suggests the possibility that milk may occasionally be an agency. In an epidemic subsequently reported by Knapp and Godfrey it would appear almost certain that the virus was distributed in the milk supply. An actual paralytic sufferer from the disease existed on the dairy farm, and was milking the cows and handling the milk for a period of four days while in the acute stage of the disease. The reporter, however, adds that while this outbreak clearly points to the possible transmission of the virus by milk the opinion is general that this is not the usual method of spread.

In outbreaks characterized by indications of a probable common source of the massed infection, a non-human mode of spread must be considered. It would indeed be unfortunate if an uncritical acceptance of Collier's theory of a healthy carrier were to lead to any failure in investigating most thoroughly every possible means of transmission, non-human as well as human, of this dread disease.

ON TELEGRAPHIST'S CRAMP

THE report of the Industrial Fatigue Research Board* on telegraphist's cramp has just been issued, and indicates a new approach to the problem of this occupational neurosis, and may at the same time throw light on the development of neuroses in general. In a report published in 1911, the earlier investigators made use of such phrases as 'nervous instability,' 'highly strung disposition,' and such like. In the investigations now recorded, subjects of cramp, and a series of non-cramp controls were put through tests involving the use of the ergograph, the MacDougall-Schuster dotting machine, and the piezograph—a telegraph key attached to an instrument recording the pressure exercised in sending messages. The results of the tests showed great variation. The cramp subjects were on the whole definitely worse than the non-cramp subjects, yet in some cramp subjects the results were better than in some controls. There was a confusing diversity of symptoms manifested during the employment of the tests. Some suffered from a general disability to use the arm; in others the disability affected only the sending of particular combinations of dots and dashes. The investigation showed that thirty-one of the forty-one cramp cases

suffered from symptoms that would lead to a diagnosis of some slight mental disturbance (psychoneurosis) characterized by anxiety, obsessions, or by the development of symptoms of hysteria. The common picture of a cramp case was a combination of psychoneurotic symptoms with muscular inefficiency. Of forty-six non-cramp subjects fifteen had psychoneurotic symptoms of varying degree.

An examination of 100 young learners showed also the rather startling result that nineteen of them manifested definite psychoneurotic tendencies. Other groups of clerical workers were similarly examined and it was found that roughly 20 per cent had symptoms indicative of a liability to breakdown. Although not expressly stated in the report the conclusion seems justified that cramp often depends upon a pre-existing psychoneurosis which may be increased by the stress of occupations demanding qualities more temperamental than intellectual, such as telegraphy and similar forms of work. It follows that young people showing psychoneurotic symptoms or muscular inefficiency should not be advised to take up telegraphy or similar forms of employment. Attention given to the emotional state of a patient when cramp first appears might offer a means of preventing its development.

* H. M. Stationery Office.

A NOTE ON RICKETS

WHILE it is not impossible that our enthusiasm for the vitamins and the ultra-violet rays may have led us to attribute to them some virtues which really belong to other factors, it would seem that we have now quite sufficient information about them to rationalize certain procedures which, until recently, were all but empirical. We have long recognized the value of cod liver oil as an antirachitic; now, seemingly, we understand why its use has not always been followed by success. And the interest which has been aroused by our newer knowledge has spurred us to a study of rickets which has revealed the prevalence of this condition,

in mild form, to an extent which was not previously suspected. Obstetricians, it is true, have long been emphasizing the importance of this condition as causative of contracted pelvis, and there can be little doubt that prevention of rickets would materially reduce the maternal mortality which we unite in deploring. We must no longer be satisfied with ability to recognize rickets by the gross deformities which it produces. Serious as these are, they are of much less consequence than the sum of less evident manifestations which, we may well believe, result from the nutritional deficiencies which underlie the condition.

Prevention of rickets, or its cure in an early stage, means the prevention of many other disorders.

It is particularly in temperate zones, where fats containing the anti-rachitic factor do not enter sufficiently into the dietary, and where the ultra-violet rays of the sun are made unavailable by habits of clothing and housing during the cold months, that rickets is found. Babies born in the late summer and autumn, no matter how well nourished they may appear to be, are singularly prone to show evidence of rickets before the end of the winter. In protecting them against the low temperatures we deprive them of the ultra-violet rays which appear to be all but essential to the proper growth and development of bony structures. Even breast fed babies suffer if the mother cannot provide the protective vitamin, and the ultra-violet rays are denied access to them. Recent studies indicate that chemical changes in the blood and x-ray findings have enabled clinicians to detect evidence of beginning rickets before the end of the first month of life. Definite clinical signs are not uncommonly manifest during the third month.

With the preventability and curability of rickets both well established it is obviously the clinician's duty to endeavour to prevent

its appearance or, if too late for this, to cure it promptly. Thus may we lessen the prevalence of unsightly and disabling skeletal deformities, of convulsive seizures in infancy, of maldeveloped teeth which are so prone to caries, and of other conditions dependent upon similar causation, as well as of all their disastrous sequelae. Prevention is simple—an adequate amount of the antirachitic factor in the diet and direct exposure of small areas of the skin to the sun for a short time daily. If the temperature is so low that an arm or leg cannot be so exposed out of doors, a window of vita-glass will permit the penetration of the ultra-violet rays, which do not pass through ordinary glass. For the children of poor people a community room with vita-glass windows facing the sun is possible in every settlement. Cod liver oil, tested to ensure the presence of the anti-rachitic factor, is everywhere available, and may be used to supplement a diet which is suspected to be deficient in this factor. In fact many clinicians are now prescribing cod liver oil as a regular feature of the baby's food. Cod liver oil fails if it lacks the anti-rachitic factor. Measures that prevent will also cure—at least in the early stages of rickets.

W. H. HATTIE

VACCINATION AGAINST TUBERCULOSIS WITH DEAD TUBERCLE BACILLI

OF THE various methods now being employed for vaccination of children against tuberculosis there are two which are finding most favour. The one is the use of an avirulent bovine tubercle bacillus advocated by Calmette and his associates and designated B.C.G., and the other the inoculation of heat killed virulent tubercle bacilli.

Calmette¹ himself has used dead organisms for vaccinating guinea pigs and cattle and produced a definite degree of immunity but discarded it in favour of his avirulent living organism, as the latter produced a higher degree and more lasting form of immunity though this even was not an absolute immunity. The exponents of the use of dead organisms for protective vaccination, notably Nathan Raw² in England, Langer³ in Ger-

many, and Petroff⁴ in America, claim from their experiments in animals that a sufficiently high degree of immunity can be produced to ward off natural infection without the danger potentially present in even the avirulent living forms.

It is now a *fait accompli* that dead tubercle bacilli produce tubercles in the animal body which are similar to those formed with living organisms, that they set up a state of general allergy and skin hypersensitiveness in the inoculated organism and call forth various forms of antibodies.

Skin hypersensitiveness has been reported in children following vaccination with dead tubercle bacilli by Raw, Langer, Fernbach,⁵ Fedders⁶ and Zadek⁷ and Meyer. This usually appears in two months, the extremes being 20 days to 5 months, and lasts two years.

Raw has vaccinated over 400 children, aged $1\frac{1}{2}$ to 14 years, in tuberculous surroundings, giving six subcutaneous injections at weekly intervals of 0.001–0.006 mg. and reports no ill effects and no death from tuberculosis. Fedders vaccinated sixty-two children with 0.1 mg. intracutaneously, followed immediately or in 24 hours by 0.4–0.9 mg. subcutaneously. More recently Zadek and Meyer vaccinated twenty-six children exposed to active cases. Nineteen of the children were returned to their contaminated surroundings and after one half to two years none showed tuberculosis by any known clinical, roentgenological or biological tests. No ill effects follow the vaccination which is usually done on the abdomen, though re-vaccination, as reported by Fedders, is followed by the formation of small cold abscesses.

The work on children has obviously not been in progress for a sufficiently long time to warrant definite conclusions being drawn, but the results are sufficiently encouraging and the inoculations sufficiently innocuous

to stimulate a further and more extensive use of this form of vaccination which is based on the experimental data of capable observers and has the advantage over any form of vaccination with living organisms, if it proves as efficacious, in that there will be no propagation and spread of the organisms.

It is indeed fortunate that there are exponents of this method of vaccination in England, Germany and America, as it will be relatively easy for any community or practitioner desiring to institute its use to obtain suitable material for vaccination.

ARNOLD BRANCH

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Bacteriology of Whooping Cough.—During the winter and spring of 1925-1926, the Commission for the Study of Whooping Cough had ample opportunity to study the disease from many angles at the clinic established at the On-Shore Department of the Boston Floating Hospital. The purpose of this report by George M. Lawson and Mary Mueller, Boston, is to give the results there obtained so far as they concern the bacteriology of the disease. Nose and throat cultures taken in the usual way have not proved of value. There are two effective methods of obtaining cultures, each of which has its advantages. One of these methods consists in inoculating Bordet-Gengou plates with the sputum. The second successful method of obtaining cultures is to hold an open plate of the medium about 5 or 6 inches in front of the patient's mouth during a paroxysm of coughing, rotating the plate slowly to insure an even distribution of the expelled droplets on the surface of the medium. The direct plating of the washed sputum has the advantage that it is usually a more reliable index as to the presence or absence of *Bacillus pertussis* than is the cough plate method. The authors examined cultures from 1,115 suspected cases, contacts and patients with whooping cough. Of these, 259, or 23 per cent,

showed the presence of *Bacillus pertussis*. From this series of cases complete records are available on 533 cases of proved whooping cough, 219 of which showed *Bacillus pertussis*. The latest positive culture was taken on the sixtieth day of the disease or the thirty-sixth day of the whoop. *Bacillus pertussis* has been isolated from nineteen patients who never whooped. Children previously shown to harbor *Bacillus pertussis* may give negative cultures early in the disease. Media used must be freshly prepared and must be properly inoculated, either by seeding with carefully washed sputum or directly by means of the cough plate methods. Single negative cultures are frequently misleading, and repeated cultures on three successive days are to be recommended, not only in establishing the diagnosis in the catarrhal stage of the disease, in second cases, and in patients who never whoop, but also in determining the length of the period of infectivity and the possibility of release from quarantine. It is suggested that the existing quarantine requirements be so changed as to include the catarrhal stage of the disease, and that the termination of this quarantine period be determined by release cultures as is the common practice to-day in diphtheria.—*J. Am. M. Ass.*, July 23, 1927.

Editorial Comments

SOME ADMINISTRATIVE ASPECTS OF INFECTIOUS DISEASE

An interesting paper on the nature and efficacy of the measures at present carried out by the health departments in England, and a criticism of the reports furnished by the public health service and by fever hospital superintendents in England, appears in a report recently issued.* In his preface to the report Sir George Newman refers to the three problems presented by an infectious disease of wide prevalence. First there is the etiological factor which in the case of several of our infectious fevers has not yet been definitely ascertained. Secondly there is the problem of securing immunity to all those who may come in contact with an infectious case on which progress had been made, and thirdly there is the practical problem of the treatment of those suffering which cannot wait for the discovery of the cause or the solution of the problems of immunity. In almost all districts of England the rule of segregation during the period of infection has been observed for a period of about fifty years or more. This principle has not availed to effectually achieve prevention of the spread of the disease. Sir George Newman considers it disappointing to find that in the case of scarlet fever notwithstanding the exceptionally high percentage of the cases admitted to isolation hospitals which obtains to-day this segregation is not associated with a corresponding lowered incidence rate of the disease in the country as a whole. Furthermore, the length of stay in the hospital does not appear to greatly diminish the chance of the patient re-infecting his home on returning to it. There is, therefore, in some districts a tendency for measures involving segregation to give place to an intelligent application of the new knowledge of the relation of ear and throat conditions to infective processes, and make use of barrier nursing and open air treatment, with the adoption of the Dick test and artificial immunity. If in these ways economy can be effected, segregation in hospitals must be reconsidered in the light of the prevalent incidence and severity of infectious disease in a locality.

The conclusions reached by the officers of the Ministry of Health in England are that in a well ordered public health system both hospital segregation and home treatment must play a

part. Too little attention in their opinion has been devoted to the possibilities of efficient home treatment. There are districts and towns where home treatment is now being adopted at a distinctly lessened cost, and so far as is known without harm to the patient or to the communities to which they belong. Further provision of nursing facilities would do much to ensure the successful development of these local experiments. In connection with such home treatment the committee regard it as more rational to practice current rather than terminal disinfection and to sterilize as promptly and as thoroughly as possible all articles exposed to contamination. The destruction of food, fluids and utensils which have in any way been contaminated by the patient, demands more attention than it has hitherto received. These conclusions however must be regarded as only provisional. The object of the report it stated to be to open the subject for wide discussion, and not to close it.

PREPARATION OF LACTIC ACID MILK MIXTURE FOR INFANT FEEDING

The *Journal of the American Medical Association* for September 10, 1927, contains an article by McKim Marriott, M.D., on Preparation of Lactic Acid Milk Mixtures for Infant Feeding. After discussing his experiences with such mixtures during the past eight years, which are altogether favourable, he gives a new and simple method of the preparation of such mixtures with the use of evaporated milk. The use of unsweetened, evaporated milk possesses a number of advantages. Such milk has already been completely sterilized and heated sufficiently so as to ensure the formation of very fine curds when the acid is added. It has a slightly lower buffer value than ordinary cows' milk because of the conversion of a part of the calcium and phosphate into a form of insoluble calcium phosphate. The fat present has been homogenized so that it does not separate out as butter fat after the addition of acid, even though shaken and stirred. Furthermore evaporated milk is easily obtainable and cheap. Evaporated milk is whole cows' milk from which about half of the water has been separated. Dr. Marriott states that the use of evaporated milk for the preparation of lactic acid milk formulæ is usually in a dilution of 1 to 1, as the evaporated milk is approximately doubly concentrated. To the one-half diluted milk 10 per cent of volume of corn syrup is added, and five drops of lactic

* Some administrative aspects of scarlet fever. Reports on Public Health and Medical Subjects No. 35, Ministry of Health, H. M. Stationery Office, 1927, p. 369.

acid to each ounce of the mixture. The method of preparation is as follows: the syrup is mixed with some water, the lactic acid added and the whole made up to the final volume. In making up the feedings equal parts of unsweetened evaporated milk and the acid and sugar solution are mixed. This is done by pouring the acid solution into the milk which is then mixed by stirring or shaking. An entire day's feeding may be prepared at once, or, as is often more convenient when travelling, a single small can of evaporated milk may be opened fresh for each feeding, the feeding bottle being half filled with the milk and the acid sugar solution then poured in. The bottle then needs merely to be shaken, warmed to body temperature, and it is then ready for feeding. It is essential that such formulæ be supplemented with orange or tomato juice daily, and, during the winter months, with cod liver oil.

R. R. STRUTHERS

ON THE DETECTION OF OCCULT BLOOD IN THE STOOLS

The clinical value of a reliable test for occult blood in the feces is generally recognized. The majority of British observers demand that the test must be performed under special conditions, and that all foods containing hæmoglobin and chlorophyll should be excluded from the diet for at least three days. Some German writers consider the pyramidon and benzidine tests as rather too delicate. Dr. A. G. Ogilvie of the pathological department of the Royal Infirmary at Newcastle, in a paper appearing in the *British Medical Journal** states that extensive experimentation has shown that the small amount of blood from bleeding gums or from small amounts of food containing hæmoglobin may be disregarded. The ingestion of considerable amounts of food containing blood such as lean meat may however give a misleading result. The benzidine reaction is the one most commonly employed. An amount of benzidine which can be lifted on a penknife is dissolved in $\frac{1}{2}$ c.c. of glacial acetic acid. This is added to 1 c.c. of an aqueous solution of the stool, and into this mixture is poured 1 c.c. of hydrogen peroxide. A greenish colour turning to blue indicates the presence of blood.

As to the delicacy of the test it may be stated that a positive reaction is obtained with dilutions of blood in water from 1/100,000 to 1/300,000 according to the purity of the benzidine. In examining faecal matter, however, unless the specimen is already coloured the reaction will only be recognized as positive in considerably less dilution. It is probable therefore that a small amount of blood from a bleeding gum or

contained in the food of a moderate diet will be too highly diluted to be demonstrable.

In any condition causing ulceration in the gastro-intestinal tract not only will a larger amount of blood be set free but in all probability the volume of food will be less. Occult blood in the stool of a patient on a low or meat free diet and in the absence of hæmorrhoids or hæmoptysis should be regarded as evidence of bleeding in the intestinal tract and should merit careful investigation.

A. H. MACCORDICK

IMPORTANCE OF REGULAR GROWTH IN CHILDREN

In discussing a paper read at the last annual meeting of the American Medical Association on The Growth of Children who are below average weight, Dr. Haven Emerson* of New York stated that in his opinion the fact of a child at any age or of either sex being below normal weight is of less importance than the fact of its not gaining steadily. The figures submitted in the paper were similar in their significance to figures previously published regarding children in competitive school work. Every child must be treated as an individual. The determination of its nutrition by the standard ratios of weight for height and age is much less reliable than the estimate of the state of nutrition by the clinician who examines the child. There should be no escape in public health work, or in private medical practice, from the physician's responsibility to search out the cause for a child's under-nourishment and for any delay or arrest in its progress of growth.

Dr. Chadwick who followed in the discussion reported an experiment which was being carried out in some of the Boston public schools on children suffering from malnutrition, hilum tuberculosis or glandular tuberculosis. Such children are placed in groups and are given a lunch and thirty minutes rest on a cot bed at 10 a.m., and a hot lunch and another half hour rest in bed at midday. The children do not go home until the end of the afternoon session. It was found that the children thus treated gained consistently each week. When they did not have the rest periods and lunches with their regular school routine they not only did not gain but actually lost weight. Too much nervous strain in the form of too much party going, too much dancing, and too much exercise and excitement of one kind or another upsets the children's regimen. Children who do not get rest sufficient for recuperation, fail to make the proper gain in growth and weight. The amount required may vary in different children and the regular increase in growth and weight should be regarded as an efficient test.

* April 23, p. 755.

* J. Am. M. Ass., September 10th, p. 849.

HOSPITALS FOR THE MENTALLY DISEASED

Writing in the *Canada Lancet and Practitioner* for July Dr. C. M. Hincks comments favourably on the recent appointment of Dr. S. W. Ryan of Kingston as Medical Director of the Ontario Mental Hospitals. Dr. Ryan was formerly Superintendent of the Ontario Hospital at Kingston, and Professor of Psychiatry at Queen's University.

His appointment comes in time to meet the many criticisms that were being made of the mental hospitals in Ontario as a result of the case of a Mr. Harry W. Zealand who was a patient in one of the mental hospitals in the province for four years. On his discharge Mr. Zealand gave an interview to a Toronto newspaper, in which he claimed that he had been wrongly detained, adding that there were many others in a similar situation.

Various articles appeared in the daily press, in which attention was drawn to the needed betterment of the nursing in mental institutions and the raising of mental hospital standards generally. It was also shown that the number of the insane in Ontario institutions is increasing about three times as rapidly as the normal population.

The discussion aroused by the Zealand case will undoubtedly do good, and we are convinced that under Dr. Ryan's supervision, the highest standards will be maintained in all our institutions for the care of the mentally afflicted. Dr. Vincent very properly insists that the care of mental disease should not be detached from its intrinsic connection with general medicine and public health.

H. E. MACDERMOT

We note with pleasure the following suggestion, proposed by the *British Medical Journal*, regarding a memorial to the late Professor J. G. Adami.

"In view of the personal popularity and scientific eminence of the late Dr. J. G. Adami, F.R.S., it is fitting that a memorial should be established in the University of Liverpool, to which, as Vice-Chancellor, he devoted himself with such energy and enthusiasm in his later years. It has been suggested that the most appropriate form for a memorial to take would be the creation of an Adami Fellowship in Pathology; for this the sum of £3,000 would be required. There must be very many old students, friends, and admirers, both in Montreal and Great Britain, who would wish to associate themselves with this tribute, and their co-operation is earnestly invited. An alternative and less ambitious proposal is the endowment of an Adami Library of Pathology in connection with the Medical Library. Donations to the Adami Memorial Fund may be sent either to the Treasurer or Registrar of the University of Liverpool,

or to Heywood's Branch of the Bank of Liverpool and Martins, Limited."

FORMATION OF A COMMISSION FOR THE STUDY OF EPIDEMIC ENCEPHALITIS

We learn* that a special commission has been formed in the United States for the study of the epidemiology and treatment of encephalitis. This has been made possible by the generosity of Mr. J. Matheson, chemist and financier who has given a large fund, the income from which is to be set aside for this purpose. The committee appointed to supervise this work consists of Dr. William Darrach, chairman; Dr. Fred Tilney; Mr. Willis D. Wood; Dr. William H. Park; Dr. Haven Emerson; Dr. Fred. P. Gay; Dr. H. S. Howe.

The investigation will be directed by Dr. Josephine Neal. Any information or suggestion in the field of epidemiology, diagnosis and therapeutics will be thankfully received by the committee through Dr. Neal, at the Academy of Medicine, 2 East 103rd St., New York City.

* *Arch. of Neurol. & Psych.*, Aug., 1927.

INTERNATIONAL CONGRESS OF OTO-RHINO-LARYNGOLOGY

In the days before the war there used to be held at intervals an International Congress of Laryngology. The last pre-war meeting was held in Berlin. Since the war this congress has not been revived, although there was a very successful Congress of Otology in Paris, under the presidency of Professor Sebilleau, in 1922. We are now glad to hear that the supporters of both these congresses have combined in launching an International Congress of Oto-Rhino-Laryngology. It will be the first of its kind, and will be held in July, 1928. It should be successful, for many reasons: it will be held on the neutral soil of Denmark; Professor Schmiegelow, the doyen of the specialty in Scandinavia, is the president, and he will be supported by a strong committee, who are all well known workers and very welcome visitors to this country. Finally, Copenhagen at the end of July will be looking its best, and should form a most delightful meeting ground.

Sir Berkeley Moynihan, Bt., President of the Royal College of Surgeons of England, has accepted an invitation to take charge of the work of the Surgical Professorial Unit at St. Bartholomew's Hospital and Medical College from June 15th to June 30th. It will be remembered that on previous occasions Professor Harvey Cushing of Harvard University, U.S.A., and Professor Hugh Cabot of Ann Arbor University, U.S.A., accepted similar invitations at St. Bartholomew's Hospital.

Special Articles

SPECIALIZATION IN MEDICINE*

By J. D. ADAMSON

Assistant Professor of Medicine, University of Manitoba, Winnipeg

In speaking of specialization in medicine, I know I am introducing a subject full of controversy. Perhaps what I shall say will only feed the flame. In order not to give you an overdose of contentious material I shall devote the first part of my time to the history of specialism.

Specialization in the practice of medicine is not a modern production; at every stage in medical history we find it. The Egyptians sub-divided their medical procedures to an absurd degree. In the Roman era we read of the Syrian writer Lucian (about 150 A.D.) travelling all the way to Rome to consult an oculist. In Britain, medicine and surgery have been specialties for 1000 years. Before that, the practice of medicine was monopolised by the ecclesiastics, they being the only group with learning. At the end of the 12th century Pope Innocent III, considering the practice of surgery to be derogatory to the dignity of priests, forbade them to undertake any operation involving loss of blood. The priests were naturally loath to relinquish a practice so lucrative and compromised by teaching surgical procedures to their barbers. Thus, in that happy day, surgeons were merely operating technicians who took their instructions from physicians. An ideal state of affairs such as that could not last, and the barbers soon began to assert their independence. They organized the guild of barber-surgeons; this formed the beginning of the College of Surgeons. From then until recent times, the two professions of the practice of physic and the practice of surgery have been quite distinct. In the past, distinction was maintained by the ordinances of Guilds and Companies, by the education of the people, and by the natural feeling of superiority on the part of the physicians. This feeling was justified by their origin from the learned class—clerics, poets, philosophers, and the gentry—as compared to that of the surgeons—from barbers, shavers, beard-trimmers and professional bath-keepers†. Not until 1423 had the surgeons risen high enough in the social scale to be considered worthy of association with

physicians. It was then that the conjoint College of Physicians and Surgeons was formed. This was for many years only a superficial association of the two cults; each one continued to be trained and to practice as specialists. The surgeon, moreover, was always kept in a subordinated position, and as late as 1632 an order in council was passed which said:

"No chirurgen shall dismember, Trephan the head, open the Chest or Belly, cut for the Stone or doe any great operation with his hand upon the body of any person—but in the presence of a learned physician, one or more of the College of his Majesties Physicians." This was unfortunately expunged in 1635.

Besides this fundamental separation into two great specialties, English medical history presents examples of even higher degrees of specialization. John of Arderne, (Plate 1) who was the first

PLATE I



JOHN OF ARDERNE, 1307-1390 (?)

The first specialist to write a medical book
(From a Fifteenth Century Manuscript reproduced in Research Studies in Medical History No. 1 by the Wellcome Historical Medical Museum, London, 1922).

Englishman to write a medical book, practiced particularly in rectal diseases; and especially in fistula in ano. Though he did not call himself a proctologist, he admitted that he was exceedingly efficient as the following quotation will show:

"John Arderne fro the first pestilence that was in the zere of oure Lord 1349 duellid in Newark in Notyngnam shire vnto the zere of oure Lord 1370 and ther I helid, many men of fistul in ano, of Whiche the first was sire Adam Eueryngham of Laxton in the clay by side Tukkesford Whiche sire Adam forsoth Was in Gascone with sir henry that tyme named Erle of Derby and after was made Duke of lancastre a noble and worthi lord. The forsaide sir Adam forsoth suffrand

* Abstract of an address delivered before the Winnipeg Medical Society, April 18, 1927.

† It is probable that surgery has other ancestors than those that were contaminated with barbering. As early as 1368 an independent guild of surgeons existed. These probably received their training in the army. See Sir Jas. Paget, Introduction to "The Craft of Surgery" by J. Flint South and D'Arcy Power, 1886.

fistulam in ano made for to aske counsel at all the leche and cirurgions that he myzt fynde in Gascone sy Burdeux at Bressax Tolows and Neyrbron and Peyters and many other places And all forsoke hym for vncurable whiche yse and yherde ye forsaide Adam hastied for to torne hom to his contre. And when he come hom he did of al his knyztly clothinges and cladde mornyng clothes in purpose of abydyng dissoluyng or lesyng of his body beyng niz to hym. At last I forseid John Arderne ysouzt and couenant ymade come to hym and did cure to hym and oure lord beyng mene I helid hym perfetely within half a zere. And aftirward hole and sounde he ledde a glad lif by 3- zere and more, ffor whiche cure I gatte myche honour and louyng thurz al ynglond. And the forsaide Duke of Lancastre and many other gentilez wondred therof."²

Many other famous examples of specialization are found throughout history. These alleged specialists were often quite untrained and owed their success to their assurance and plausibility and to the gullibility of the public. Hogarth's famous engraving (Plate 2) entitled the "Under-

PLATE II



FROM AN ENGRAVING BY HOGARTH

A caricature of the medical profession in the 18th century

takers Arms" and inscribed "*et Plurima mortis imago*" is a caricature of the profession in the 18th century. Taylor, an oculist, Mrs. Mapp, a quack bone-setter, and Spot Ward, an advertising nostrum vendor, are given the chief positions. The figures in the body of the picture are likenesses of various other practitioners of the day, who cannot now be identified. The uroscopist is prominently shown. These specialists of the 18th century were the representatives of the more important specialties of the present day; ophthalmology, orthopaedic surgery, internal medicine and urology.

* Master John Arderne. "De Arte Phisicali Et De Cirurgia" 1412. Translated by Sir D'Arcy Power in Wellcome Research Study No. 1, 1922.

The specialism of past ages was so intermingled with quackery as to be indistinguishable from it. Jeaffreson in his "Book About Doctors"^{*} says, "The only difference between a physician and a charlatan in feudal days was that the former was a fool and the latter was a rogue." Perhaps some surgeons will say that the rule still holds.

Although specialism of sorts had its origin in days long past, the trained and recognized specialism in legitimate medicine, as we know it to-day, has had its chief growth during the past 50 years. When Sir Wm. Osler returned to Montreal after post-graduate work in Europe, he for a time contemplated specializing in disease of the eye, ear, nose and throat. On finding that Dr. Buller had already chosen that work he changed his plan, evidently considering that one individual in that field was enough in a city of over 100,000†. Since that time, specialism has increased to an enormous extent in all countries, but more particularly in America. The present day situation may be indicated by a few facts. In 1920, 53 per cent of all the medical graduates in the United States immediately embarked upon a course calculated to lead them directly into specialism. In Winnipeg to-day there are over 100 medical men practising well defined specialties, and it is safe to say that there are no medical men who attempt to cover the whole field of medicine, surgery and obstetrics. The number of special branches represented is over twenty. Group clinics, which in America are doing a large percentage of the paying practice, are essentially groups of specialists. Throughout the whole civilized world hospital appointments are going more and more to those who are restricting their practice.

Along with this increase in the number of specialists, we have a corresponding increase in their variety. Medical activities have been subdivided to such an extent that we now have individuals whose sole care is the function of one gland, and others whose only thought is for the symmetry of a single orifice.

After all, modern specialism represents the greatest general development medicine has ever known; it is merely a manifestation of the universal law of evolution to be seen in every biological process and every human activity—development from the simple to the complex, from the homogeneous to the highly differentiated. The recent additions to medical knowledge have made it utterly impossible for any individual to absorb more than a portion of it. Specialization is imperative if the work is to be done properly, and if progress is to continue. Men specialize, not essentially for materialistic reasons, but because they realize the utter futility of attempting omniscience. Modern methods of transportation are contributing to the develop-

* J. Gordy Jeaffreson. "A Book About Doctors," Carleton Publishers, New York, 1862.

† Harvey Cushing. "The Life of Sir William Osler." The Clarendon Press, Oxford, 1925.

ment of specialism. In any country with good roads people are flocking more and more to large centres for treatment by specially trained men. As a result the country practitioner himself is becoming a specialist—a specialist in obstetrics and acute illnesses.

For these reasons and others that could be given, specialism is inevitable and will increase. The general practitioner is naturally going. Even now, there are no general practitioners, *i.e.*, no single individual actually attempting to handle every type of case. Such a pose would be shamefully unfair to the public.

A most important function is that subserved by the research worker. He furnishes the framework upon which the whole fabric of medical practice is woven. This vocation is proverbially unremunerative. In Winnipeg we have no more than a score of men engaged in this all-important work; one successful surgeon could pay all their salaries. A similar defect is felt throughout America where the chief anxiety in most universities is for men to fill these positions. The lure of a lucrative practice hypnotizes the recent graduate and there is no mechanism to divert him from the siren's call.

Other anomalies in the distribution and performance of special work are readily thought of—one about which bitter complaint is often heard is the possibility of improperly qualified individuals parading as specialists; all that is required is some self-assurance and some gold letters on the door. This state of affairs is recognized as a reproach on all of us.

It is unnecessary to go into further detail with respect to shortcomings in the functions of our modern medical organization—they are known to all. The important matter is to find a solution. Rudimentary centres of control are seen in various countries. In England, a form of State Medicine was thrust on the profession much to its displeasure. In the United States private organizations, on account of their wealth, are becoming the dominating centre. Last year, Dr. James McKenty, in referring to this subject, said: "Hospitals have been encouraged by an influential section of the profession to assume the duties which an organized profession neglected."*. Is State Medicine the solution? That awful apparition, whose name inspires only distrust in most medical minds, may be after all a no more fearsome master than the one we live under. Already it is fairly well established in Manitoba; we have it represented by the University, the Workmen's Compensation Board, the Provincial Sanatorium, the Municipal Hospitals and free Clinics supported by public funds, the Department of S.C.R., municipal control of various hospitals, and municipal representation on the boards of others, and indeed complete municipal control in some districts. This list by no means

includes all of the State medical institutions. More are appearing every year. Indeed, we are swiftly drifting down the stream that leads to State Medicine—in spite of our protests. Is this course desirable? If not, can we still get a line ashore? If we could pull ourselves out of this drift where would we look for another solution of our many difficulties, some of which I have indicated in connection with specialism?

I cannot answer these questions but feel sure that the facts are these:

- (1) The medical profession has no central controlling head.
- (2) Inco-ordination and distortion of function is therefore common.
- (3) As a consequence outside forces are insidiously drifting us to state medicine.
- (4) Most of us say that we do not want to arrive at this destination, but all of us are helping towards it by acquiescing in or even initiating each minor advance.

THE TREATMENT OF ACUTE LOBAR PNEUMONIA

At the recent meeting of the British Medical Association in Edinburgh Professor John Hay, of Liverpool, read an interesting paper on the modern treatment of acute lobar pneumonia. In beginning his paper he commented on the lack of unanimity as to the nature of this disease, and stated that the drift of opinion now was to regard it as essentially a local disease with a tendency to become a general one. The causal organism was the pneumococcus, and the primary site of infection was in the lungs. Four types were recognized, the incidence and death rate in each being as follows:

Type	Relative incidence in adults	Mortality per cent
1	nearly one-third	25
2	nearly one-quarter	33
3	nearly one-tenth	50
4	more than one-quarter	10

Out of 100 cases seventy-five would probably survive; fifteen would probably die, and in the remainder correct treatment and good nursing might turn the scale in their favour.

As regards prophylaxis, he thought that more care should be given to the prevention of contagion than was generally the case. Patients nursed in a general ward should be screened off, and sputum and clothing disinfected. Gargling with an antiseptic was advisable for those in attendance. Prophylactic injections had proved useful in South Africa in diminishing both incidence and mortality. Such protection was certainly advisable in the case of those nursing or treating pneumonia. The common cause of death in uncomplicated pneumonia was failure of the

* Dr. Jas. McKenty. "The Relation of the Medical Profession to Hospitals." *Canadian Medical Association Journal*, 1927, vol. xvii.

circulation in which the important factors were the toxæmia, the anoxæmia, and the stress on the right heart. The essentials of effective treatment were fresh air and complete physical and mental rest. All unnecessary movement was to be avoided. Tepid sponging carefully given made the patient more comfortable. Plenty of fluid, and fluid only, should be given during the first forty-eight hours. At the onset small doses of calomel or salines may in some cases be advantageous, and if necessary a simple enema. Distension of the abdomen should be carefully watched for. If it occurred an enema may be given, and if necessary pituitrin injected. Regarding specific treatment there was much difference of opinion. As regards vaccine treatment Professor Hay's own attitude had been critical. All advocates of it agreed that to be of use it must be given within the first three days. Captain Malone's paper published in 1925 was instructive, and appeared to justify the statement that early vaccination lessened the duration of the fever and accelerated the crisis. In case of type 1 pneumonia, the special serum for it appeared to be of service, if injected intravenously in doses of 100 c.c. every eight hours. Symptomatic treatment was often necessary and of value. Pain and insomnia must be overcome if rest was to be secured. So long as the air passages were dry an opiate may be employed. After the fifth day opium should be given cautiously, especially if there were much secretion in the bronchi. Vasomotor tone was to be maintained by hydrotherapy. The depth of respiration could be increased by cool fresh air and by the relief of pleuritic pain. Oxygen should be administered at the first indication of cyanosis. It was probably the best cardiac stimulant. The funnel method was futile. More efficient was the nasal catheter with the other nostril blocked with cotton wool. Better still was the mask, but patients would rarely tolerate anything over nose and mouth. Digitalis had a favourable action on the contractile power of the heart, quite apart from controlling its rate. Its routine use was of value and from 45 to 60 minims of the tincture should be given at the start. No scientific evidence had been advanced in favour of the view that alcohol was a cardiac stimulant. In a series of 150 cases the mortality of those treated with alcohol was greater than in those in which alcohol was not used. Pituitrin was indicated if the blood pressure fell. Caffeine was a direct cardiac stimulant. Engorged jugulars with an increase of cardiac dullness to the right might justify venesection, but the relief was only temporary. In practice the wise physician in this disease used drugs very carefully.

In the after discussion Dr. Morley Fletcher, of London, agreed that once the diagnosis was made the patient should be disturbed as little as possible. He was also in general agreement with regard to alcohol, but he thought the pendulum was swinging, perhaps, too far; in his opinion there was danger in the absolute prohibition of

alcohol in pneumonia. Diathermy he considered worthy of consideration. Oxygen given adequately and systematically was our most important therapeutic agent. Dr. Davidson, of Edinburgh, put in a strong plea for serum therapy. In his opinion there was overwhelming experimental evidence as well as direct evidence as manifested in the clinical results at the Rockefeller Institute.

ACUTE PNEUMONIA IN EARLY CHILDHOOD

An interesting discussion took place in the section of Diseases of Children at the recent meeting of the British Medical Association on the subject of "Acute Pneumonia in Early Childhood." The subject was opened by Dr. Charles MacNeil, of Edinburgh, who stated that his paper was based on a series of 558 cases of acute pneumonia admitted to his ward during the last six and a half years. Slightly more than half the patients were under two years of age. In these the mortality was 30 per cent, whereas in children from two to twelve years the mortality was only 5.7 per cent. Thus the disease was far more common and more deadly during the first two years of life than in the succeeding years of childhood. These facts suggested the question as to whether there was any difference in the prevailing type at these different ages. Dr. Agnes McGregor had investigated this point in 100 fatal cases and had found that lobar pneumonia as compared with broncho-pneumonia was a rare disease during the early years of life. As a pathological process lobar pneumonia was the simpler type. In it as the result of the inflammation a fibrinous exudate was poured out into the alveoli, but the framework of the lung including the bronchial walls appeared to be undamaged and after the crisis a rapid resolution of the exudate took place without any resultant permanent changes in structure. Alveolar pneumonia, rather than lobar pneumonia was a more accurate description of the pathological process. In broncho-pneumonia the process was much more complicated and showed much variation in the extent and the importance of the morbid changes. In addition to the varying type of the exudate into the alveoli the interstitial framework of the lungs suffered injury. It was this interstitial inflammation which determined the longer course of the disease, its greater immediate danger, and its greater risk of permanent damage to the lung tissue by the later development of fibrosis, bronchitis and bronchiectasis. While many points were described by which the two types might be distinguished during life, Dr. MacNeil regarded the cardinal differential signs as only two: the duration of the fever and the rapidity of the resolution. There was prolonged fever and slow resolution in broncho-pneumonia, compared with short fever and rapid resolution in lobar pneumonia. Fever

and consolidation persisting over a period of two weeks indicated broncho-pneumonia. In the majority of cases the differential diagnosis was not difficult. One clinical type of pneumonia, not uncommon, presented some difficulty, namely, that in which there was extensive consolidation limited to one area of the lungs, the type sometimes described as confluent broncho-pneumonia. These cases were more frequently met with during the first year, and were usually accompanied by early empyema, and could in no way be distinguished during life from broncho-pneumonia. Pneumonia, in Dr. MacNeil's experience, was rare in healthy and well cared for children of any age, and its prevalence in early life, he thought, must be due to a deterioration of the pulmonary function produced by bad environment and hygiene. Professor Leonard Finley in discussing the paper said that there was no difficulty in diagnosing cases of secondary broncho-pneumonia, but the diagnosis of primary broncho-pneumonia was quite a different proposition. He had tried to decide on the distinguishing clinical features but had frequently found that cases which during life had been diagnosed as lobar pneumonia were discovered at autopsy to be broncho-pneumonia. He had therefore come to regard age as an important diagnostic criterion.

In his experience lobar pneumonia was almost never found post mortem in children under three years of age. In children over three years of age, primary pneumonia was almost invariably found to be lobar in type. From January, 1925, till March, 1926, all the cases dying of pneumonia in his wards had been examined pathologically. Of a total number of sixty-five cases examined thirty-five were examples of primary pneumonia under the age of three years. Of these, fifteen were typical broncho-pneumonia. In fourteen cases although the clinical characteristics and the gross appearances were those of lobar pneumonia histological examination proved them to be broncho-pneumonia. In five cases, it was difficult to decide, but they appeared to be of the mixed type. In only one case was the disease of the lobar type. He had therefore come to the opinion that the prevailing type of pneumonia in infants was almost invariably a broncho-pneumonia. This was of great importance because

the infiltration of the interstitial tissues meant that without care fibrosis and finally bronchiectasis was apt to follow in time.

Dr. Thursfield, of London, spoke in reference to the treatment. He had come to the conclusion that there was no material advantage in attempting to distinguish between broncho-pneumonia and lobar pneumonia in children under four years of age. All the complications of primary broncho-pneumonia appeared to be due to the pneumococcus, and for the purpose of treatment it was necessary to assume that the pneumonic symptoms were due to one disease and to one organism. For many years the treatment had remained unchanged, and he had therefore arrived at the conclusion that it was advisable to try specific methods. Anti-pneumococcal serum was costly, and had to be given intravenously every day, a matter of great difficulty in young children; even so, it only dealt with one type of pneumonia. For the past three or four years he had used vaccines in every case of severe pneumonia. The vaccine he used was a stock pneumococcal vaccine sensitized by the addition of rabbit serum. He gave 50,000,000 of this vaccine on the first day, 100,000,000 on the second day, and 250,000,000 on the third day. Of 126 cases of pneumonia which had come under his care ninety-nine did not receive vaccine. The average age of these unvaccinated cases was two years and eight months, and twenty-eight died. Fifty-eight were under two years and of these twenty-four died; twenty-seven cases received vaccine treatment, their average age being two years. Four of the cases died. The number of vaccinated cases under two was thirteen, of whom four died; and over two years of age fourteen, all of whom recovered. Although he did not claim that these figures established any proposition they were encouraging. It must be remembered that only the severe cases were given vaccines, and his impression of the results obtained was that the condition, twenty-four to forty-eight hours after the injection of those who had received vaccine, was better than would have been expected if they had not been treated with vaccine. He pleaded for a further use of specific therapy.

A Sign of Hepatic Insufficiency.—Not enough attention has been drawn, says Dr. Noël Fiesinger, of Paris, to a sign of gross hepatic insufficiency which may be observed in the mouth. On inspecting the buccal and pharyngeal mucous membrane, he states, it is common to see a special red colour—a vivid carmine—over the palate, the throat, and the inner side of the cheeks; the tongue also may show this discolouration at the tip, at the sides, and often also at the base. In serious cases it peels completely and is as glazed as in typhoid, though more red.

The patients complain especially of heat or dryness in the mouth. The sign is seen especially in alcoholic cirrhosis, in severe icterus, and in serious toxic and infective states. When seen, it suggests that the condition is serious, requiring rigorous treatment and absolute rest, and the prognosis should be very guarded. When the colour persists it must give rise to a fear of complications, such as gastric hæmorrhage or severe jaundice. It is apparently due to vascular degeneration; on each side of the uvula one may see varicosity of the capillaries.—Paris Correspondence, July 23, 1927.

Medico-Legal

MEDICAL CONFIDENCES AND THE LAW

An unfortunate conflict of loyalties has been thrust upon the medical profession in England, and a situation has arisen in which the professional tradition of secrecy in regard to patients' communications has to face a new challenge.

Arrangements officially organized by the Ministry of Health have involved the treatment of venereal disease on a greatly increased scale. Simultaneously, the law has made increased demands for evidence which can only be given by the medical man in attendance. This has been occasioned by the considerable increase in divorce petitions which has taken place during the past few years; partly because of the social unsettlement of the war period; partly because divorce has been made easier for the wife, and partly because of a change in the law which has enabled a married woman to apply for a separation order on the ground that her husband had insisted upon marital relations while he was suffering from venereal disease. The case is quoted of a medical practitioner from the Birmingham General Hospital who was subpoenaed on behalf of a wife petitioning for divorce, and compelled to give evidence concerning the treatment of her husband in the hospital two years previously. The physician protested not only on the grounds of professional secrecy, but also because he was not at the head of the hospital department at that time. He asserted that a number of doctors were engaged in the treatment, and all had their own papers which were their personal property. The judge stated that the witness was entitled to no privilege but must produce the information, and threatened that if he did not do so every medical man, and a number of the officials from the hospital would be called to the court until the documents were made available, and the doctors who refused to obey would be sent to prison. His Lordship said that while the medical profession normally was under the duty of keeping inviolate confidential knowledge obtained from a patient and regarded as necessary for the treatment of the case, and might become liable to civil action for damages if without lawful excuse the law of confidence was broken, nevertheless in a court of law the doctor had no privilege similar to that held by a solicitor or legal adviser, and might be compelled to disclose communications however confidential. The *Lancet* calls upon the Minister of Health to make it clear by regulation, or by act of parliament that in these matters

confidences are not misplaced and communications are inviolable as much to the medical profession, as to the legal.

POSITION OF THE PROFESSION IN QUEBEC

Concerning the position of the profession in the Province of Quebec, Eugene Lafleur, K.C., LL.D., states as follows:

In answer to your request for a brief statement of our own law on the subject, I think the following summary will show that the law of the Province of Quebec affords greater protection to the medical practitioner and to his patient than the law of England.

Under the old French law which was preserved in this province at the time of the cession, it was well settled that physicians owed a duty to their patients to keep their secrets inviolate, especially in cases which might affect their reputation, and a violation of this duty rendered the physician liable for damages to his patient.

Following the old French jurisprudence, our Court of Appeal in 1879, condemned a physician to pay damages to his patient because in an action taken by him against the latter he had mentioned in his statement of claim the nature of the illness which he had treated.

But while the law held the physician strictly to his duty in that regard, there was not until recent times any legislation which conferred upon the medical practitioner the same privilege as that enjoyed by the lawyer as to testifying in court.

I find a case decided in 1865 in the Superior Court of Montreal in which it was held that a physician is compelled when examined as a witness in court to disclose the information acquired by him confidentially in his professional character, and the objection taken by the witness to the question as tending to violate the rules of his profession was over-ruled.

In 1907, however, in an act to amend the law respecting physicians and surgeons, an amendment was introduced providing that a physician cannot be compelled to disclose what has been revealed to him confidentially in his professional capacity, and this provision has been repeated in the Quebec Medical Act now in force (Revised Statutes of Quebec, 1925, cap. 213, section 60).

Correspondence

To the Editor:

From time to time in the current literature, the intravenous administration of neutral acriflavine solution is recommended in the treatment of certain diseases, among the most important of which are septicæmia, encephalitis, etc.

It has been more or less of a revelation to me, however, to note that the doses are so small. It has been my experience with this drug, that much larger doses can be used with safety.

I have been able to use this drug in some few cases of puerperal fever in which, however, positive blood cultures were not obtained. The reasons for giving the drug was that the pyrexia was of such a degree that one feared a beginning septicæmia.

In the beginning I administered .1 per cent solutions of neutral acriflavine dissolved in physiological saline in doses of 30-100 c.c. It was not long, however, before it was seen that the dose could be increased to 250 c.c. of a .5 per cent solution for patients of about 150 pounds, given as often as daily.

The symptoms of which the patient would complain when the complete dose had been given would be yellow vision and nausea. In addition to these symptoms, which were transient, a quite marked greenish yellow tinge was imparted to the skin and sclera. The discoloration disappeared rapidly.

Yours truly,
G. W. CARROW, M.B.

189 Humberside Avenue,
Toronto, Sept. 13th, 1927.

London Letter

(From our correspondent)

The Voluntary Hospital System.—An intelligent foreigner visiting this country is always impressed by the curious way in which many British institutions are run. He marvels at the apparent haphazard method in which we manage; for example, our music is without state aid, and our legal and parliamentary systems, if he ever understands them, fill him with wonder. If he is interested in matters of health, he will be impressed by the preventive and co-ordinative work of the Ministry of Health, but he will be left wondering why our hospital system still retains so much of the middle ages about it. From time to time someone gets up and pronounces the funeral oration of the voluntary system, and this is always followed by a chorus of people who see in state aid only mischievous bureaucracy. Mr. Ernest Hey Groves, the well-known Bristol surgeon, is the latest iconoclast, and as far back as June he delivered an address on the present hospital system, the discussion on which is still

reverberating in the columns of the medical press. He said quite bluntly that the voluntary system is not dead but moribund, and artificially kept alive, and he urges a co-ordinated policy in each large centre with a central hospital board of management. This does not sound very revolutionary, but behind it is the knowledge that whenever such a scheme is broached in any district, local rivalries between hospital boards come into play and wreck any scheme. It must be remembered that side by side with the voluntary hospitals, doing splendid work with far too few beds, there are large municipal hospitals (as Poor law infirmaries and the like are now styled) with almost unlimited clinical material and beds to spare. Between these two systems there is a great gulf—almost entirely a social gulf—which it seems impossible to bridge. Mr. Hey Groves is not alone in his anxieties, for the British Hospitals Association and the British Medical Association at Edinburgh have quite recently discussed the problem. There is a feeling that undoubtedly some change must take place in our present system, but whether the State shall take over the financial administration of the voluntary hospitals is likely to be hotly debated for many years to come. Mr. Hey Groves points to the examples of other countries which he has visited: Canada, Denmark, Switzerland and Spain, where such a hospital plan as he advocates is in operation, and he also aptly quotes the example of the scheme existing in Germany and Austria. The voluntary system has done most excellent work in the past, and it has, without doubt, a place in the future, but it will soon have to find some typically British compromise, a "formula" in the diplomatist's sense, if it is to maintain the position of British hospitals in the medical world.

Ice-Cream and Food Poisoning. About this time last year a curious outbreak of gastro-enteritis in London was described in these notes, and it was mentioned that ice-cream was blamed at first, but later exonerated. Just recently another outbreak has occurred in Somerset, and this time it seems probable that ice-cream can be traced as the source. It appears that early in August, nearly 250 cases of gastro-enteritis occurred in the city of Bath, and the district round it. In each case the symptoms consisted of an initial rigor followed by profuse and persistent diarrhoea, associated with vomiting in the early stages. The patients had raised temperatures and rapid pulses, and appeared drowsy, while one child, aged 5, died. In each case it was found that ice-cream, sold by a particular dealer who travels about the district in a motor-cycle and side-car, had been eaten about 12 hours previously. Investigation of the faeces

of some of the patients, and of the gastric contents of the fatal case, revealed the presence of an organism of the salmonella group, actually the "mutton" type of Aertrycke's bacillus, and this organism has also been discovered in a sample of the ice-cream, by a pathologist of the Ministry of Health. The chain of evidence incriminating the ice-cream is therefore fairly strong, but how it became infected still remains undecided, for the vendor declares that it was made in the usual way from first rate ingredients, and under conditions of cleanliness, and so forth, which have been closely investigated and pronounced as completely satisfactory. Such outbreaks are, to say the least, alarming for they indicate that preventive measures may not guarantee the absence of bacteriological contamination from food.

The Red Cross.—The peace-time activities of the Red Cross Societies throughout the world are watched by intelligent men and women with great interest. Some of the work being done, for example, in the matter of health propaganda, is no doubt far removed from the original ideas which came to Henry Dunant at the battle of Solferino, but much of the development of the British Red Cross Society as indicated in the report for the year 1926, just issued, is a direct

result of war-time work and more distantly related to the Geneva ideals. For example, there are still many officers suffering from pulmonary tuberculosis, who are helped by the Council of the Society to get abroad for sanatorium treatment pending the settlement of their claim. Again the home ambulance service is of great service in bringing serious cases of accident and disease to hospitals, especially in country districts. Arrangements are now made for ambulances to work in conjunction with the life-boat services around the coast, and there is also close co-operation with the police and automobile associations in connection with street accidents. Although the Council provides the ambulances, more than £100,000 having been spent on this, they are run, housed and maintained by voluntary workers. Another important piece of work is in connection with a mobile x-ray service which consists of a complete plant and enables radiographs to be taken of patients confined to bed in their homes. The Red Cross also is responsible for running hospital libraries, and kindred services which go so much to improve the comfort of the patient; its organizing work in connection with a blood transfusion service in London has already been described.

ALAN MONCRIEFF

London, September, 1927.

Clippings on Current Topics

STIMULANTS OF THE UTERUS

With the end of August, 1927, came the legal enforcement of a uniform strength for all preparations of pituitary extract sold in this country. The strength of the preparation is to be stated in units, the unit being defined as the amount of activity present in 0.5 mg. of the standard. The preparations on the market for the most part contain 10 units per c.c.; if a dose of 2 units is required, the doctor must measure 0.2 c.c. or 3.5 minims of the standardized solution. Now that uniform potency has been established by biological tests on uterine muscle, it remains to investigate and define the limits of safety in clinical dosage. This task has been attempted by the ideal combination for this purpose of an obstetric surgeon working with a pharmacologist. Mr. A. W. Bourne and Dr. J. H. Burn have described in the *Journal of Obstetrics and Gynaecology of the British Empire* (vol. 34, No. 2, p. 249) the results of joint investigations carried out at Queen Charlotte's Hospital. In order to obtain records of uterine pressure a rubber bag in the form of a

hollow disc $1\frac{3}{8}$ in. in diameter was introduced into the human uterus. The bag was stiffened just sufficiently to prevent it from folding over while being inserted into the uterus by a stout iron wire bent into a ring, and the end of this wire was passed through a gum elastic catheter which was attached to the bag. A piece of rubber pressure tubing 12 feet long joined the other end of the catheter to a recording manometer. By means of glass T pieces inserted in the course of the pressure tubing, and connected with a water reservoir and with hand bellows, the air in the bag could be displaced by water. It was found that this bag could be inserted into the uterus of the unanesthetized patient, between the edge of the os and the membranes of vertex, and gently pushed up along the postero-lateral wall without producing any ill-effects. The results of several observations on primiparae were that in the majority of the women in labour a dose of 2 units of pituitary extract is sufficient to produce a definite and sometimes a striking increase in the strength and frequency of the uterine contractions. The effect produced by the injection appears to be of two kinds. In five cases the uterus passed into a mild tonic contraction with superimposed waves of rhythmic contraction. In eight cases there was an

Abstract of article appearing in *Lancet*, Sept. 10, and in *Jour. Obst. and Gynaecology of Brit. Emp.*, April, 1927.

increase only in the force and frequency of the uterine contraction, the intermediate relaxation being complete. The records show that it was in cases where the os was not dilated more than enough to admit two fingers that the injection most often produced tonic contraction and that in these, with one exception, it did not produce rapid increase of dilatation; in fact, they provide evidence that the least advantage is obtained when the injection is made too early in the first stage. As to the dangers of pituitary extract, Mr. Bourne and his collaborator express conviction that these are due solely to excessive dosage. In their experience a dose of 2 units is safe in any stage of labour in all cases where there is no mechanical obstruction.

The effect on the uterus of the different physiologically active substances to be found in ergot has also been the subject of inquiry by Mr. Bourne and Dr. Burn, and this part of their work is of special interest in view of the conflicting evidence on the subject. The official liquid extract of ergot has since the 1914 issue of the B.P. been a watery, whereas it was formerly an alcoholic extract. The extract as now prepared contains little or none of the specific alkaloid, ergotoxin. America has disregarded the international agreement and retains the alcoholic extract. This difference of technique is of considerable importance in assessing results, since, whereas the preparation of ergot commonly used in America is one in which the specific alkaloid is retained, British practitioners favour an extract from which the specific alkaloid has been removed in the process of extraction. This anomaly has led to the suggestion that the clinical activity of ergot is due not to the specific alkaloid, but to the presence of the putrefactive bases tyramine and histamine. Some precise method of testing clinical impressions of the efficacy of the various constituents of ergot in stimulating uterine muscle was thus urgently required. Mr. Bourne's optimism, expressed at the meeting already referred to, that some useful results might be obtained from an instrumental method of gauging uterine contractions has been justified. The results show that neither histamine nor tyramine in the proportions present in the B.P. liquid extract is responsible for the traditional value of ergot, though histamine in large doses (2 mg.) has a relatively powerful effect on uterine muscle.

The specific alkaloid of ergot, used in the form of ergotamine tartrate has been found to exert in the most striking way the action which has always been supposed to characterize the drug. Its effect, unlike that of pituitary extract, is not to intensify the processes already in being, but to produce a condition of uterine spasm, which, though dangerous so long as the child or the placenta remain *in utero*, is admirably suited to the needs of the puerperium.

The duration of this effect appears to be prolonged, and stands in the most complete contrast to the fleeting character of the action of histamine. . . . It is clear, therefore, that none of the ergot alkaloids have a place in labour proper, that is before the child or placenta are delivered; but as a means of treatment of post-partum hemorrhage it is possible that the specific alkaloid may be of more real value than pituitary extract in maintaining a firm and prolonged contraction. Ergotamine is not immediate in its action, and a period of 20 to 30 minutes appears to be necessary before its effect is developed after hypodermic administration. Histamine on the other hand is immediate, and our results suggest that a mixture of these two substances may be the ideal agent for arresting a post-partum hemorrhage. A solution containing 2.0 mg. of histamine and 0.5 to 1.0 mg. ergotamine or ergotoxin administered by hypodermic injection should produce an immediate but lasting effect in this condition, the histamine exerting its action during the latent period of the action of the ergotamine. It does not appear that tyramine has any place whatever in obstetrical therapeutics.

THE COST OF NOISE

The report on harmful noise, which Prof. H. J. Spooner submitted to the International Fatigue Committee of the American Society of Industrial Engineers on May 26th, should serve to keep attention fixed on this important subject, and contains many observations of general interest. He believes that the most serious aspect of the problem has hitherto not been considered; this is the loss due to impairment of efficiency with men of affairs and principals, whose capacity for clear thinking and hard work is perceptibly weakened by the babel of noise. He estimates that the economic loss due to this kind of wastage may conceivably be a great deal over a million pounds a week in this country alone; and though this figure may well be an over-estimate, no one will deny that the attempt to do mental work in noisy and distracting surroundings tends to lower efficiency and produce irritability. The uproar of mechanically-propelled traffic and of other machinery in our streets is the most serious source of noise, and the noisy environment of hospitals, nursing homes, and schools calls for earnest attention. Prof. Spooner believes that the most nerve-shattering sound in our streets is caused by tramway-cars; he considers that these vehicles have lost most of the reasons for their existence since the introduction of motor omnibuses, and points out that they are being gradually scrapped and are doomed to ultimate extinction. Here, perhaps, the thought is but the offspring of the wish, in which many motorists must share from

ulterior motives. He makes other recommendations of interest to motorists—namely, that noisy ramshackle motor vehicles should be warned off the streets, that motor horns should be standardized to a low melodious pitch, that louder hooters should only be used in emergencies, and that “driving-on-the-hoot” should be prohibited. Such reforms are undoubtedly desirable, though difficult to enforce, and a beginning ought to be made in the attempt to diminish the uproar of the streets. The further proposal is made that the pneumatic rock-drills, used for breaking up roads, should not be permitted in towns, and certainly not in the vicinity of hospitals and schools. In factories and works, Prof. Spooner urges, designers of machinery should pay more attention to the balancing of rotating parts, particularly of those working at high speed, and to the mounting of certain machinery on anti-vibration supports; noisy machinery means excessive wear and waste of power, and the noise tends to reduce the productive powers of the workers and may be a cause of accidents. We hope that the movement for the reduction or prevention of harmful noise will achieve its object by awakening public opinion. — *Lancet*, July 16, 1927.

THE DESCENT OF MAN

We are all too apt to overlook the simplest and most fundamental conceptions on which our thinking lives are based. Sir Arthur Keith's presidential address to the British Association at Leeds, is of real and immediate moment to medicine and hygiene, though he tells a tale and reaches a conclusion which are familiar enough. Putting aside the difficult questions of the meaning and mechanism of evolution, he shows that all the evidence which has accumulated in the last 60 years has done nothing but strengthen Darwin's proposition that man is descended from the lower animals. It is a truth—or if anyone prefer the phrase, a working hypothesis—which we cannot drive too firmly into our minds, for there is still much to be done in working out its implications for human life. To find the remains of a branchial cleft in a man's neck is to have a pleasing contact with a noble conception. And as man's body has come from animal's flesh, so it is hardly possible to deny that all that governs and inspires his functions is correlated with the same source. We do not sufficiently reflect that Darwin's argument about the history of man's form is equally applicable to the history of his function; we get indeed more useful help from evolution in understanding what man does than in appreciating his anatomy. As a historical tool, therefore, the idea is indispensable and it may be expected to yield at least as much in the future as it has in

the past. But a real belief in evolution implies more than this interest in what has gone by. If progressive change in the constitutions of animals has happened in the past, we have no reason to doubt that it is happening now and will go on happening in the future. What man will come to, no one can tell. But a belief in the Descent of Man is the first and necessary component of that lively faith in the possibilities of human amelioration without which no serious attempts at perfection can be long maintained.—*Lancet*, September 3, 1927.

THE EVOLUTION OF VACCINIA VIRUS FROM EPITHELIOMA CONTAGIOSUM

In a recent article on the mechanism of virus infections* we drew attention to a remarkable phenomenon exhibited by many virus diseases, which has no counterpart in bacterial diseases. Many virus infections in their clinical behaviour and in their spontaneous infectivity appear to be distinct and specific diseases. But experimental transmission can often break through this specificity and thus establish the same causal agent for apparently distinct virus diseases. Evidence is gradually accumulating that the vaccinia virus, for instance, can affect widely different species and there set up lesions which formerly were considered to be distinct diseases. Thus the observations of Heelsbergen of Toyoda on fowl-pox, and of Zwiek on stomatitis pustulosa contagiosa of the horse, have shown that these diseases are closely allied to each other and to Jenner's horse-pox and other animal variolas. A recent paper by Dr. C. G. Pandit† adds further evidence on this point. By intracutaneous inoculation of calves with the infective material from epithelioma contagiosum of fowls and subsequent repeated passages through calves, monkeys, and back to calves again Dr. Pandit claims to have evolved a strain of vaccinia virus producing the typical lesion and conferring immunity to inoculation with vaccinia virus. An interesting point is that calf passages alone are not sufficient to effect this development, but that the interposition of a passage through monkeys is necessary. The skin and cornea of rabbits reacted negatively to inoculation with the infective material taken directly from fowl-pox. But when inoculated with passage material obtained from different stages of development of the strain, a successful reaction was obtained first on the cornea, and

* The *Lancet*, 1927, i, 32.

† The Relation of the Virus of Contagious Epithelioma of Fowls to the Virus of Variola and that of Vaccinia. I. The Evolution of a Strain of Vaccinia Virus from the Virus of Contagious Epithelioma of Fowls. *Indian Journal of Medical Research*, 1927, xiv, 885.

in later stages of development also on the skin. In our article, referred to above, we pointed out in connexion with recent work on mosaic disease of plants that many of the apparently paradoxical phenomena observed in the experimental transmission of virus diseases may be due to the fact that the infective material is loosely identified with the "virus." But actually in transmitting the disease the whole infected tissue is used and this in addition to the virus probably contains other substances which modify and determine the pathogenic action of the virus. The present series of observations present features very similar to those recorded in the transmission of mosaic disease from one species of plant to another and are capable of the same explanation.—*Lancet*, July 16, 1927.

TYPES OF STREPTOCOCCI IN SCARLET FEVER

Dr. F. Griffith, of the Ministry of Health, has found that hæmolytic streptococci isolated from cases of scarlet fever fall into three main serological groups (Types 1, 2, 3), while a large heterogeneous group of organisms—roughly 50 per cent of the whole—which seem to possess individual antigenic properties are designated Type 4. Of these groups Type 2 is the most sharply defined, and is found only in association with scarlet fever, while Types 1 and 3 show relationship with hæmolytic streptococci from non-scarlatinal sources, such as puerperal fever and sore throat. Similar results have also been obtained by G. R. James and J. Smith, and an attempt has now been made by Dr. William Gunn to correlate the type of streptococcus found in scarlet fever with the clinical findings. One hundred patients with scarlet fever were investigated, and streptococci were isolated from 93 of them. In two cases the organisms were of Type 1, in 34 cases of Type 2, and in 17 cases of Type 3, whilst in the remaining 40 they were either of Type 4 or unclassified. The proportion of types was not dependent on any age-groups. No definite conclusions could be drawn about streptococci of Type 1 as only two cases occurred in the series; Type 2 was associated with the most typical and severe forms of the disease; Type 3 with those which were less severe; and Type 4 appeared to cause only a

mild attack. The complications were most severe when Type 2 organisms were found, and were less numerous and severe in Types 3 and 4. Infection by the unclassified strains clinically resembled infection by Type 3. There were four instances of scarlet fever occurring in two members of the same family, and in each case the type of streptococcus isolated from different members of the family was the same (Type 2 three times and Type 3 once). The differences in type of the scarlatinal streptococci may explain the different results obtained with the same batch of scarlatinal antiserum in cases apparently similar from a clinical standpoint, and may also explain why some cases give anomalous results to the Dick and Schultz-Charlton tests. It will be necessary to consider the risk that a patient with mild Type 4 infection may be attacked whilst in hospital by a virulent Type 2 streptococcus; it has often been observed that when hospital beds are close together the proportion of cases developing scarlatinal complications may become larger. Though the importance of recognizing the various types of scarlatinal streptococci has not been fully determined, it is obvious that etiology of scarlet fever is not quite as simple as was thought at first.—Editorial, *Lancet*, Sept. 3, 1927.

DIAGNOSIS OF DRUNKENNESS

In view of the difficulty in making the diagnosis of acute alcoholic intoxication from the clinical evidence alone, as may be confirmed from a review of the data in the cases presented, and in view of the constancy of the observations as to the concentration of alcohol in the urine and in the breath with reference to the degree of alcoholic intoxication, it is concluded by Dr. E. Bogen that the examination of patients to determine the state of intoxication should in every case include some quantitative determination of the amount of alcohol present in the urine, breath or body fluids. It is not expected that such a test should supersede and entirely replace all of the other clinical evidence presented, but Bogen relies on the alcoholic concentration in the urine, breath or tissues as the most important single factor in arriving at a correct conclusion as to the degree of intoxication of a patient.—*J. Am. M. Ass.*, Sept. 10, 1927.

Treatment of Heart Disease Other Than by Drugs—Paul D. White, Boston, emphasizes the fact that in the treatment of heart disease, the most important relief frequently comes from agents other than drugs. Rest and recreation, physical and mental, exercise, climate, psycho-

therapy, physical therapy, regulation of the diet, and of the fluid ingested, surgical intervention and venesection all have a place of variable importance. Each one of these measures is discussed.—*J. Am. M. Ass.*, Aug. 6, 1927.

Provincial and Local Association Notes

ONTARIO MEDICAL ASSOCIATION ANNUAL MEETING OF DISTRICT NO. 2

The eighth annual meeting of District No. 2, of the Ontario Medical Association, was held in the city of Brantford on Friday September 9th, with eighty members present.

In the forenoon the medical staff held clinics in Brantford General Hospital. At 2.30 the members met at the Brantford Golf and Country Club. Dr. E. R. Secord, a past president of the Ontario Medical Association introduced Dr. A. T. Bazin of Montreal, who gave an interesting address on "Empyema," particularly in regard to treatment, which was much appreciated, being full of useful information for the general practitioner. Dr. Morrison of Brantford introduced Dr. A. H. Gordon of Montreal who addressed the meeting on "Some Clinical Features of Cerebro-Spinal Fever." Dr. Gordon emphasized the great importance of diagnosis in this condition and the early and continued specific treatment.

After dinner, at which the Brant County Society acted as hosts, Dr. Perry G. Goldsmith of Toronto gave a paper on "Inflammation of the Middle Ear Tract," full of useful facts in regard to the diagnosis and treatment of a condition which all must often meet.

Dr. Weston Krupp of Woodstock, President, and Dr. T. C. Routley, Secretary of the Ontario Medical Association, both addressed the meeting. They traced the growth and increasing usefulness of the Association, and showed the unfortunate position we would be in had we not had an actively organized body.

At the business meeting Dr. Ward Woolner of Ayr, was re-nominated as counsellor for 1927-28. Dr. W. F. Gallow, of Goderich, Dr. A. J. McGanithy, of Kitchener, and Dr. W. A. McIntosh, of Simcoe, were elected vice-counsellors. Simcoe was chosen as the next place of meeting. Dr. Ward Woolner, counsellor, presided. This was the fourth year Dr. Woolner has been in charge of the District meeting.

The thanks of the Association are due to Brant County Society for carrying through such a successful day. Dr. Harold Palmer, President and Dr. J. R. Calder, Secretary, were untiring in their efforts for the welfare and comfort of all.

MANITOBA MEDICAL ASSOCIATION ANNUAL MEETING

The recent meeting of the Manitoba Medical Association was one of the most successful in its history. An innovation this year was the

setting aside of an afternoon for the discussion of public health problems, particularly in rural districts. There was a large attendance of rural medical health officers; Dr. McCalman, Chairman of the Provincial Board of Health was also present and stated that a medical survey of the province would be made in the near future. Two hundred and thirty doctors registered as present at the meeting.

The public health meeting created much interest owing especially to Hon. Dr. E. W. Montgomery, the newly appointed Minister of Health, making his first public announcement of a public health programme. In spite of the extreme heat, the lecture theatre A at the university was packed. Dr. Alan Brown of Toronto spoke on "The Constitution of the Child" laying emphasis on the importance of heredity, and the value of eugenics as a means of preventing deterioration of the race. Prof. C. H. O'Donoghue gave a witty address on "Some Aspects of Parasitology." This was his last public appearance in Winnipeg before leaving for Edinburgh where he has accepted a position in the university.

At the business meeting the following officers were elected for the ensuing year: *President*, Dr. H. W. Lewis, Angusville; *First Vice-President*, Dr. J. D. Adamson, Winnipeg; *Second Vice-President*, Dr. M. C. O'Brien, Birtle; *Secretary*, Dr. Bruce Chown, Winnipeg; *Treasurer*, Dr. A. C. Aikenhead, Winnipeg.

Drs. A. F. Menzies, (Morden), J. S. McInnes, (Winnipeg), and R. J. Waugh, (Carberry), were added to the executive. Dr. W. Harvey Smith of Winnipeg was appointed permanent chairman of The Committee of Arrangements for the 1930 meeting of the British Medical Association in Winnipeg.

Resolutions were passed asking that legal opinion be obtained as to the definition of an expert witness in medico-legal cases, and that a committee be appointed to consider the question of maternal mortality in Manitoba and to report at the next annual meeting. Another resolution supported the proposed municipal auditorium. At the public health session it was resolved that the provincial government through the new department of public health, be requested to arrange for a full survey by commission of hospitals and hospitalization throughout the province. In addition, the commission will be asked to consider the economic problem of adequate hospitalization for persons of small or moderate means. The action of the government in establishing a portfolio of health and public welfare was heartily endorsed in another resolution.

At the luncheon on the opening day, Dr. J. D. McQueen the retiring president, gave a scholarly address on "Milestones in the Evolution of Obstetrics." Dr. T. C. Routley, always a welcome visitor, spoke on the position of the Canadian Medical Association at the luncheon on September 13th. Dr. A. T. Bazin of Montreal addressed the Kiwanis Club of Winnipeg at the Fort Garry Hotel on the same day. The annual dinner and the dinner in honour of the visiting ladies, were held on the evening of September 13th, and were followed by a most enjoyable dance. On the afternoon of September 14th, a golf tournament was held on the Niakwa course.

Papers were given by the following: Drs. J. D. McEachern, A. T. Bazin, B. J. Brandson, Campbell Howard, J. K. McGregor, O. Bjornson, Alan Brown, E. W. Montgomery, C. H. O'Donoghue, M. C. O'Brien, E. J. Boardman, J. R. Davidson, C. R. Gilmour, Hugh Mackay, A. T. Mathers, E. S. Moorhead, A. A. Murray, B. H. Olson and L. N. Pickard.

ALBERTA MEDICAL ASSOCIATION

*Twenty-First Annual Meeting, Calgary,
September 14th, 15th and 16th*

The twenty-first Annual Meeting of the Alberta Medical Association was held in Calgary on September 14th, 15th and 16th, and from the standpoint of the attendance and of the importance and value of the subjects dealt with, has not been excelled in the history of this Association.

The success of the meeting was assured when it became known that Professors A. T. Bazin and Campbell P. Howard of Montreal, Professor Alan Brown of Toronto, and Dr. J. K. McGregor of Hamilton would be present. Each one of these well-known clinicians contributed papers and gave clinics with a largess which was gratifying to every member of our Association. The thanks of our provincial organization are due, not only to these men, but also to the Canadian Medical Association, which made it possible to have them with us.

Owing to the prevalence of acute anterior poliomyelitis in various districts through the province, this subject was naturally uppermost in the minds of many of those present. Though not on the programme, a considerable portion of one afternoon and evening was devoted to a thorough discussion of this disease, its nature, its diagnosis and its treatment, and the means best adapted to restrict the spread of this crippling, as well as devastating malady. Many of the leading physicians of the province took part in this discussion.

A smoker was held on the evening of the first day, during which the adjourned business meeting of the Alberta Medical Association was resumed, and the Annual Meeting of the College

of Physicians and Surgeons of Alberta was held.

The members of the Calgary Medical Society gave a banquet to the visiting members, as well as to the special guests of the evening, which included Dr. T. C. Routley, General Secretary of the Canadian Medical Association. Dr. Routley was the chief speaker of the evening, and in his address impressed on each physician the reasons why we should become affiliated with our national Association.

Special mention should be made regarding the clinics held at the Calgary General and at the Holy Cross Hospitals by the visitors from eastern Canada. These were, in the minds of the large number who attended, the outstanding features of the meeting. They were notable, not only because of the excellence of the clinical instruction, but also for the many refinements in diagnosis which were given.

The clinics were conducted by: Dr. J. K. McGregor, on "Goitre and its Treatment"; Professor Alan Brown, on "Eczema and Asthma"; Professor A. T. Bazin, on "Diagnosis and Management of early Cancer of the Breast"; Professor Campbell P. Howard, on "Sub-Acute and Chronic Arthritis."

Valuable papers were also read by Professor A. T. Bazin, on "Acute Abdominal Lesions in Infancy and Childhood," also on "Empyema"; by Professor Campbell P. Howard, on "The Classification, Symptoms and Treatment of Nephritis"; also on "The Incidence of Anæmia in Private Consultation Practice"; by Professor Alan Brown, on "Intestinal Indigestion in Older Children", and on "Feeding Problems with certain types of Infants and Children"; by Dr. J. K. McGregor, on "Surgical Lesions of the Stomach," and on "Surgical End Results, Immediate and Remote."

Papers were read by the following members of the Association: Dr. R. B. O'Callaghan, Calgary, on "Some Rare Abdominal Tumours"; Dr. Fulton Gillespie, Edmonton, on "Blood Transfusion"; Dr. H. W. McGill, Calgary, on "Report of a Case of Gas Gangrene"; Dr. A. H. Baker, Calgary, on "Artificial Pneumothorax"; Dr. C. W. Hurlburt, Edmonton, on "The Cardiac Cripple"; Dr. W. H. McGuffin, Calgary, on "Multiple Exostoses"; Dr. E. B. Roach, Calgary, on "Rheumatism in Children"; R. G. Harrison, Phm.B., Lamont, on "The Relationship of the Druggist to the Physician"; Dr. C. C. Tatham, Edmonton, on "Some Observations on the Treatment of Goitre"; Dr. M. G. Cody, Calgary, on "Pneumonia in Children"; Dr. G. E. Leamonth, Calgary, on "Certain Acute Pulmonary Complications of the Puerperium with Special Reference to Lung Abscess and Operative Treatment."

The following officers were elected for 1927-1928: *Honorary President*, Dr. C. E. Smythe, Medicine Hat; *First Past President*, Dr. W. Merritt, Calgary; *Presi-*

dent, Dr. W. A. Scanlon, Edmonton; *First Vice-President*, Dr. P. M. Campbell, Lethbridge; *Second Vice-President*, Dr. R. Parsons, Red Deer; *Secretary*, Dr. G. C. Smith, Edmonton; *Treasurer*, Dr. R. M. Reid, Vegreville.

Committee: Dr. A. J. McMillan, Claresholm; Dr. A. E. Kennedy, Stettler; Dr. F. T. Campbell, Calgary.
Representatives on the Council of the Canadian

Medical Association: Dr. R. E. Archer, Lamont; Dr. E. L. Connor, Lethbridge; Dr. J. R. Bell, Edmonton; Dr. W. Hackney, Calgary; Dr. R. E. Buswell, High River.

Editorial Committee for the Journal of the Canadian Medical Association: Dr. G. E. Learmonth, (Chairman); Dr. A. C. Dixon; Dr. P. M. Campbell; Dr. Harold Orr; Dr. T. H. Whitelaw.

G. E. LEARMONTH

Abstracts from Current Literature

MEDICINE

The Use and Abuse of Iodine in the Treatment and Prevention of Goitre. Marine, D., *Ann. of Clin. Med.*, April, 1927.

The author is convinced that great confusion of thought exists in connection with the real and fancied relations of the thyroid gland to disease. The gland undergoes a definite cycle of cell changes and, so far as is now known, only one cycle during the development and regression of goitre. Degenerations, atrophies, hæmorrhages, cyst formation, etc., are secondary and should be separated from the primary changes.

Considering the physiology, chemistry and pathology of the gland, disease disturbances may be classified as follows:

1. Thyroid insufficiencies: (a) simple goitre; (b) myxœdema.
2. Graves' disease.

Iodine has been used in the treatment of goitre for 107 years and in its prevention for ten years. Since the discovery of iodine as a normal constituent of the thyroid, research in the fields of physiology, chemistry and pathology supports the view that simple goitre is a work hypertrophy depending on an absolute or relative deficiency of iodine, the etiology of which is not clear. The absolute deficiency manifests itself in cases of endemic goitre, while the relative is seen in sporadic goitre of adolescence, pregnancy, infections, abnormal diets and Graves' disease.

The amount of iodine required to prevent the onset of goitre is 0.1 per cent of iodine per gramme of dried gland. Experiments by Lenhart and the author showed that 1 mg. of iodine given by mouth once a week was ample to protect puppies against thyroid enlargement while living under conditions which produced goitre in controls. It was also shown that adding iodine to water, one part per million, completely protected brook trout. Feeding whole hashed sea fish once a week also protected brook trout and, finally, the observations of other workers would indicate that 1 mg. per

week not only prevented but caused regression of thyroid enlargement in children. The amount of iodine required for the prevention of goitre in man is exceedingly small, being about 0.1 mg. daily, that is, a total of 36 mg. yearly.

Two plans of goitre prevention are now on trial. First, the use of tablets containing 1 mg. or more of iodine given at weekly intervals, and second, the use of iodized salt. The author is convinced that the wholesale use by the public of iodized salt of too high an iodine content has been productive of much harm in the management of goitre. Experiments in salt administration are being carried out in Switzerland and Italy under more favourable conditions than in the United States, due attention being paid to the physiology and pathology of the thyroid, and to careful estimation of the iodine content of the salt placed upon the market. The author is convinced that Graves' disease has been caused or aggravated by the excessive use of iodized salt, but is also certain that the injury done in this way has been negligible in comparison with the injury now being done by the excessive use of iodine in other forms. Salt is the most natural and simplest means of distributing the traces of iodine required in our food if adequate control could be established.

With regard to iodine in the treatment of simple goitre the author advocates the administration of desiccated thyroid in 0.1 and certainly not greater than 0.2 gramme doses daily for a period of two weeks. If, after two weeks, on examination there have been no changes in pulse rate or body weight, the treatment may be repeated. After an interval of from one to two weeks 10 mg. daily should be given for a period of two or three weeks. Doses of 1 c.c. of either syrup of hydriodic acid or syrup of ferrous iodide are suitable preparations for administration. The author points out that one c.c. of Lugol's solution contains approximately 125 mg. of iodine. It will be seen that the amount of iodine used in the treatment of goitre is fifty times greater than that recommended for prevention.

With regard to iodine in the treatment of Graves' disease the author believes that iodine decreases the exhaustion crises, so characteristic of the disease, and lowers the operative mortality not primarily because of a lowering of metabolic rate but because iodine in some unknown way raises the patient's resistance. Patients with Graves' disease who are receiving iodine as a pre-operative preparation should be under close supervision, for the long continued use of iodine in this type of disease is decidedly harmful in a vast majority of cases.

R. V. B. SHIER

Cardiac Pain in Paroxysmal Tachycardia.

Barnes, A. R. and Willius, F. A., *Am. Heart J.*, June, 1927, ii, 491.

From a group of 380 cases in which the diagnosis of paroxysmal tachycardia was made, nineteen who presented symptoms resembling angina pectoris were specially analyzed. The differential diagnosis depends chiefly on a determination of the presence of paroxysmal tachycardia. Secondary features of importance are: the attack of pain is of relatively long duration if coronary thrombosis can be ruled out; the painful seizures occur over a long period of years without serious outcome; and the etiological factors of pain usually associated with angina pectoris, such as exertion, cold, etc., play no significant part in initiating the pain in cases of paroxysmal tachycardia. The prognosis depends upon the underlying cardiac injury; as paroxysmal tachycardia frequently occurs in patients with little or no cardiac lesion the prognosis is usually good. Treatment consists in measures directed towards arresting the attack of tachycardia.

HAROLD N. SEGALL

The Influence of Changes in the Rate and Irregularity in the Action of the Heart on the Coronary Circulation. Miller, G. H., Smith, Fred M. and Graber, V. C., *Am. Heart J.*, June, 1927, ii, 479.

Using a preparation of the isolated rabbit's heart these authors observed an increase in coronary flow accompanying increased heart rate; this effect was found to be most pronounced when the heart rate was increased from 120 to 170. When the initial rate was about 150, cardiac acceleration was not accompanied by a corresponding augmentation in coronary flow.

Measurement of coronary circulation in a preparation of the whole animal (dog) revealed a similar relation between heart rate and coronary flow. Changes in rate were produced by heating and cooling the sinus node or by stimulating the vagus nerve. Alterations in rhythm were accompanied by little or no change in coronary flow. Premature contrac-

tions of auricular or ventricular origin caused no change in coronary flow. Auricular fibrillation at times resulted in slight acceleration of coronary flow; this effect seems to depend upon the rate and force of ventricular contractions.

HAROLD N. SEGALL

The Effects of Chloral on the Heart; Experimental Electrocardiographic Study. Frommel, E., *Arch. d. Mal. du Coeur*, July, 1927, xx, 441.

Chloral has a toxic effect on the heart producing a disturbance of the conduction of impulses from auricles to ventricles and also disturbances in the cardiac rhythm. In rabbits after increasing doses of chloral the heart rate first becomes slowed; and the conduction of the impulse within the heart is depressed. Then the rate becomes accelerated and conduction more rapid. A third phase consists again of a slowing of the rate and the conduction—the P-R interval now attains its maximum. A fourth stage in which A-V nodal rhythm or idio-ventricular rhythm becomes established occurs with the largest doses of chloral.

HAROLD N. SEGALL

Cheyne-Stokes Breathing and Tachycardia.

Wassermann, S., *Med. Klinik.*, 1926, xxii, 881.

Cardiac dyspnoea does not invariably depend on pulmonary congestion. There are many cases in which failure of the left ventricle with probable stasis in the systemic circulation is manifested in its earliest stages by dyspnoea. Two cases of paroxysmal auricular fibrillation, in which Cheyne-Stokes breathing appeared towards the end of the attack, and in which no signs of pulmonary congestion existed, are reported as evidence in favour of the theory that cardiac dyspnoea of an extreme degree may result from failure in the systemic circulation alone. Cheyne-Stokes respiration disappeared when the paroxysmal auricular fibrillation ceased and normal rhythm was resumed.

HAROLD N. SEGALL

SURGERY

Branchiogenic Tumours of the Neck. Belk, William P., *Surg. Clin. N.A.*, April, 1927.

These tumours have been studied for years under the name of salivary gland tumours. Wood, Wilson and Willis, and McFarland have all written interesting papers. The cases now reported number 359.

The author reports ten cases, four of which illustrate well the cardinal facts, while six fatal cases bring out a feature but lightly dealt with in previous papers. Branchiogenic tumours are characterized by their localization in the lateral aspect of the neck, most frequently in the parotid region; by a history of long duration;

a slow growth followed often by acceleration; a tendency to cure by local excision. Some erode and compress locally, while others form distant metastases.

Structurally the tumours are of a mixed type, showing myxomatous tissue, cellular and hyaline connective tissue, cartilage, endothelial cells and squamous cells. The histological appearance is one of malignancy. McFarland has said that all mixed tumours of the neck are branchiogenic, but that all branchiogenic tumours are not mixed.

The first four of the ten cases reported by the author fit in with the definition as outlined. All are living and apparently cured. Of the balance, six ran a fatal course, three with distant metastases. The benign group yield well to excision but poorly to radiation. Owing to the present tendency to radiate malignant tumours, it is imperative to make an accurate diagnosis at the first visit of the patient. The points in favour of deciding for malignancy are pain, rapid growth, deep fixation of the tumour, short duration and older age incidence.

R. V. B. SHIER

Epigastric Hernia in its Relation to Intra-Abdominal Disease. Sullivan, Daniel F., and Antupit, Louis, *Ann. Surg.*, September, 1927.

Patients, not infrequently, have made the rounds of the general practitioner, the gastroenterologist and the surgeon supposedly suffering from the gastric crisis of syphilis, perforating gastric ulcer, appendicitis, cholecystitis, or other intra-abdominal condition, only to find, after a thorough examination, a small epigastric hernia. After citing three case histories, the authors go on to discuss the etiology, symptomatology, diagnoses, and treatment of this condition.

Epigastric hernia forms 2 per cent as compared with other types of hernia. In considering the anatomy of the epigastric region, the following points are noted: (a) The recti-muscles have a wider separation above the umbilicus than below. (b) The linea alba is merely a joining of fibres of both anterior and posterior sheaths. (c) The vessels of the falciform perforate the transversalis fascia and linea alba. This site of perforation is the point of potential weakness in the fascia. Once a tab of fat has perforated the weak point, intra-abdominal pressure completes the formation of a hernial sac. Quain discusses two types: (a) Peritoneal lipoma without a sac. (b) True hernia with a sac. The authors suggest, however, that the type is dependent upon the duration of the condition.

The symptomatology is misleading. Nausea, vomiting, belching of gas and sourness with, or without, pain are complained of. There is tenderness in the epigastrium and gall bladder

area with sometimes referred pains to the shoulder blades. One would expect that the absence of the typical pain and its relation to food and lack of periodicity would easily exclude typical ulcer, gall bladder or carcinoma, but we must remember that less than 50 per cent of these cases give the so-called text-book picture.

The small hernia is the most difficult to differentiate from actual disease of the stomach, duodenum and gall bladder. The larger ones are not so easily overlooked. Inspection and palpation with the patient in the standing posture commonly gives a "surgical crepitus," while coughing or stooping tends to aggravate the condition. X-ray examination is of great importance in excluding organic lesions.

Surgery is of course the treatment of choice. The operation best suited to provide a cure is much the same as for umbilical hernia. Moscheowitz prefers the vertical incision and a suture placed above and below. It is always advisable to explore the intra-abdominal organs and careful follow-up after these patients leave hospital is essential.

R. V. B. SHIER

Hydrocele of the Tunica Vaginalis. Campbell, Meredith F., *Surg., Gynec. & Obst.*, August, 1927.

Hydrocele is the most common tumour associated with the male reproductive tract. The diagnosis is usually correctly made, but may be extremely difficult. The treatment is surgical, but the post-operative complications may be alarming. In view of this fact, the author was led to make an analysis of 502 hydroceles presented by 456 patients and operated on by 29 different operators.

Hydroceles may be classified as:

1. Hydrocele of testes
 - A. Within the tunica vaginalis
 - (1) Ordinary.
 - (2) Congenital
 - (3) Infantile
 - (4) Inguinal
 - B. Encysted of testes and epididymis
2. Hydrocele of the cord
 - A. Diffuse
 - B. Encysted
3. Above complicated by hernia.
4. Hydrocele of hernia sac.

Hydrocele in infants is rare, practically always congenital and associated with hernia. Ninety per cent of the patients investigated were over 21 years of age, the condition being most common between the ages of 20 and 30. The duration of the condition in over 50 per cent was between 2 months and 3 years.

Epididymitis is probably the most frequent precursor of hydrocele, acute or chronic, and may be gonorrhoeal or tuberculous. Sub-acute,

painless, non-gonorrhœal epididymitis is of more frequent occurrence than is generally recognized.

Trauma, that is an actual blow on the testis, was noted in 34 of the patients. A common and also unavoidable form of injury was that received at the operating table. Thirty patients presented hydroceles which appeared immediately following an operation in the region of the spermatic cord, such as hernia and varicocele. The author believes that very great care should always be observed in handling the spermatic cord and, furthermore, that it should be remembered that whenever the testicle or epididymis is attacked surgically an eversion of the vaginalis should always be done before the scrotum is closed.

Congenital hydrocele is rare, but the idiopathic type accounts for the majority. There is usually a history of swelling with no antecedent local condition. The author believes, however, that an unrecognized asymptomatic epididymitis is also the usual underlying process in this group.

After discussing the symptoms, the following differential diagnoses are presented: Hernia; spermatocele; hamatocele; chylocele, this latter is encountered in the tropics; gumma; the œdema of chronic passive congestion; and neoplasms of the testicle. The neoplasms give a history of rapid growth with pain, the presence of a solid, hard mass and negative to transillumination.

With regard to treatment, the author states that tapping is often curative in children, but that, in adults, fluid usually reforms. There are two types of surgical procedures. (1) Injection with 5 to 20 minims of pure phenol. The fluid is completely aspirated from the sac, the phenol injected and the scrotum thoroughly massaged. The success of this method rests upon the thoroughness of the agglutination of the vaginalis surfaces. This method should only be used in uncomplicated hydroceles with thin walls and clear fluid. (2) Open operation is the treatment of choice. In practice, the author prefers the excision and eversion operation of Winkelman and in all but 7 cases (done by the Andrews method) this technique was employed. By this method, the redundant vaginalis is excised, complete hæmostasis is obtained, a running suture being taken in the vaginalis if necessary, and the remaining edges everted and sutured behind the cord. Following the operation a hæmostatic scrotal compression bandage is applied.

The average stay in hospital in uninfected cases is about 6 days.

The chance of recurrence is about 3 times greater following tapping and injection than after the open operation.

R. V. B. SHIER

Controllable Factors Affecting the Mortality of Acute Appendicitis. Bower, J. O., and Clark, J. H., *J. Am. M. Ass.*, 1927, lxxxix, 11

Nothing is said in this paper which has not been said before, but the subject is one in which frequent repetition is necessary. Not the least reason for this, according to the authors, is that there are still certain fallacies in the teaching of the day regarding acute appendicitis. Some text-books still repeat the teaching of the late John B. Murphy as enunciated in 1890; but that was at a period in medicine when most of the cases of appendicitis coming to operation had gone on to abscess and peritonitis. We have now reached the stage when differentiation between uncomplicated appendicitis and peritonitis can be made, and attention should be focussed on the early recognition of the former.

The authors state that statistics show an increase in the mortality of acute appendicitis during the past ten years. They (and others) have shown that there is a close relationship between this mortality and the time that elapses between the onset of symptoms and operation. Perhaps the main reason for delay in operating arises from the hesitation with which the diagnosis is made. It is, therefore, all important to pick out the predominant symptoms by which the certainty of the diagnosis may be increased.

Their review of cases brings out the fact that the only symptom which was unfailingly present was pain: this was the case whether there was peritoneal involvement or not. Localized tenderness and leucocytosis were the next two most prominent symptoms, the first occurring in nearly 90 per cent of cases and the other in nearly 80 per cent. Increase in pulse rate was found in only 44.1 per cent of cases without peritoneal involvement. With the development of peritonitis the pulse rate rose rapidly. Nausea, vomiting, heightened temperature, and constipation were all found to be symptoms of such variable occurrence as to be of no very definite diagnostic importance in themselves.

It is proposed to control this factor of delay by frequent reminders to physicians referring patients to the hospital. These reminders should emphasize the vital importance of operation at the earliest possible moment, and should also bring out the symptoms and signs of early appendicitis, as distinct from peritonitis.

The second important factor in affecting the mortality from acute appendicitis is the administration of laxatives. It is suggested that the public be more generally informed of the danger of this practice. It was found that in the year 1926, 92 per cent of patients dying

from peritonitis caused by perforated appendix had had purgatives before admission.

H. E. MACDERMOT

UROLOGY

Hexylresorcinol in Urinary Tract Infections.

Eberbach, C. W., and Arn, R. D., *J. Am. M. Ass.*, 1927, lxxxix, 512.

This report of the therapeutic effect of hexylresorcinol is based on observations on its use in a series of about 200 cases of upper urinary tract infection. Since the majority of the patients were of the chronic type in which usual therapeutic measures had failed, they afforded a good opportunity for testing the efficacy of the drug.

In general the results obtained by these authors are less brilliant than those reported by other observers. In eighty-two cases only was there sufficient evidence from which to judge of the value of hexylresorcinol. From their study of these they conclude that the drug will cure about one-third of cases of upper urinary tract infections in whom foci of infection and all types of urinary tract obstruction have been removed. In addition to these there will be about 20 per cent of symptomatic cures. Improvement will be obtained in 43 per cent, and no change is to be expected in 25 per cent.

But even if it fails to entirely clear up infections of this type, hexylresorcinol has a valuable effect in its rapid and continued relief of symptoms in all but one-fourth of cases. In mixed infections it was found that cocci often disappeared from the urine while colon bacilli remained.

The drug was administered in 0.6 grm. doses in olive oil after meals, thrice daily. Patients were directed not to force fluids. No sodium bicarbonate was allowed, on account of its action on surface tension, with consequent lowering of the bactericidal action of the drug.

Apparently the authors do not expect that a higher proportion of cures than reported by them, is likely to be obtained from the use of this drug, even when combined with other effective methods of treatment of urinary tract infections.

H. E. MACDERMOT

ANÆSTHESIA

Spinal Anæsthesia in Post-Operative and Other Forms of Ileus. Grieg, D. M., *Edinb. M. J.*, 1927, n.s. xxxiv, 470.

This paper is a critical review of the literature on this subject. The effect of spinal anæsthesia is to remove the inhibitory influence of the spinal cord on the bowels. Wagner, Duval, Bonniot and others have reported cases of intestinal obstruction, from such causes as strangulated hernia, volvulus and obstruction due to

bands, in which the injection of a spinal anæsthesia was almost immediately followed by a copious evacuation of the bowels and a marked improvement in the condition of the patient for operation. In paralytic ileus no treatment beyond the injection was required. Lapointe, however, found that spontaneous evacuation took place in only 5 per cent of patients with obstruction, and thinks that the successful cases published represent only a very small proportion of those treated. Okineyze considers the sudden evacuation not without danger. The fall of blood pressure is also a serious matter; and forbids the use of spinal anæsthesia in patients who are exhausted, toxic or collapsed.

W. B. HOWELL

De la Préservation et du Traitement des Complications Pulmonaires Post-Opératoires. The Prevention and Treatment of Post-Operative Pulmonary Complications. Kummer E., *Revue Médical de la Suisse Romande*, 1927, xlvii, 181.

At the writer's clinics, with a view to preventing pulmonary sequelæ of operations, the mouths of patients are carefully examined beforehand and as far as possible restored to a healthy condition. In a large number of cases the pneumococcus was found to be present before, and absent after treatment. Another prophylactic measure practised is pulmonary gymnastics. Respiratory complications occurred in 196 patients out of 4122 who had been operated on. Fifty-one of these patients died. Operations for the radical cure of hernia, done under local anæsthesia were more frequently followed by lung complications than operations for appendicitis, done under ether. One of the important factors in causing these complications is stasis in the pulmonary circulation, the result of inhibition of respiratory movements by pain. Another cause is embolism. In one of the writer's cases infection took place through the lymphatics of the diaphragm, empyema following an operation for septic peritonitis.

W. B. HOWELL

PÆDIATRICS

Gonococcus Arthritis in Infancy. A Clinical Study of 44 Cases. Cooperman, M. B., *Am. J. Dis. Child.*, June, 1927.

Cooperman's report is concerned with the arthritis produced by an outbreak of gonococcus infection in a nursery in a maternity hospital in Philadelphia, affecting sixty-seven infants, of whom fifty-three presented joint complications. None died.

The rectum is indicated as the most likely portal of entry because a number of male and female infants had purulent rectal discharges, ischio-rectal abscesses and positive rectal

smears. The infection was conveyed through the abdominal lymphatics to the blood stream and thence metastasized to the joints.

The article is lengthy and worth reading in full. The author's conclusions are as follows:

1. Periodical examinations of hospital help and routine bacteriological studies of cervical and vaginal smears of expectant mothers before admission to maternity hospitals are prophylactic measures in eliminating these as possible sources of gonorrhoea.

2. The importance of an early diagnosis of gonococcus sepsis in the new-born housed in hospitals cannot be too strongly emphasized. The disease once introduced into such institutions spreads with incredible rapidity, infecting all new-born infants, who are exceedingly susceptible to the infection. Such prodromal symptoms as mild elevations of temperature, skin eruptions, superficial abscesses and swelling of the joints should make one suspect the presence of gonorrhoea, the diagnosis of which can be made in the early stages by rectal and vaginal smears and bacteriological studies of joint exudates.

3. The rectum is a portal of entry for gonococci that hitherto has not been sufficiently stressed. The organisms invade the blood stream shortly after the initial local implantation and rapidly metastasize to predisposed joints.

4. Two forms of gonococcus arthritis are observed in infancy—one accompanied by a great deal of swelling and tenderness suggesting suppuration, and the other a subacute synovitis with effusion. Multiple arthritis is the rule in 75 per cent of the cases.

5. Infantile joints, because of their cartilaginous nature, display a marked resistance to the infection. Suppuration of the joints exceedingly damaging to adult articulations by producing terminal ankyloses was not observed in any of the cases.

6. Gonococci may invade the medullary cavities of the long bones and set up localized destructive processes. Spontaneous recovery occurs, as proved by the roentgen ray.

7. The hip joints showed the most serious of the complications, becoming spontaneously dislocated in the early stages of the infection. The prognosis in these cases is not favourable, owing to the structural damage to the acetabular cavity and femoral head.

8. Fixation in casts, aspirations, incisions and diathermy are the remedies par excellence in the treatment of gonorrhoeal arthritis. Vaccines are of doubtful value.

9. The effect of the gonococcus infection on the epiphyses was to retard their growth, delay the appear-

ance of centres of ossification and in cases of the capital epiphyses of the femur and humerus to produce fragmentation and even complete absorption.

10. The sequelae are best treated by physiotherapy. Dislocations of the hip joints should not be reduced before two years of age.

R. R. STRUTHERS

Tuberculin Sensitivity in Children after Vaccination with Langer's Vaccine No. 147 (Killed tubercle bacilli). Fedders, G., *Deut. med. Woch.*, 1925, li, 1659.

Sixty-two children were vaccinated with killed tubercle bacilli from birth to two years old. They were given several tuberculin skin tests before vaccination which was only employed in the tuberculin negative infants without a tuberculous family history. The dose was 0.1 mg. intracutaneously followed by 0.4 to 0.9 mg. subcutaneously given in twenty-four hours. There was no general reaction following this but local reddening and slight infiltration which disappears, but is followed by a secondary reaction when the tuberculin test became positive a small abscess forming. Fifty cases showed a positive skin tuberculin test in three weeks to five months. Four autopsies were performed and in no case were any tubercles found in the organs. Re-vaccination in both the allergic and pre-allergic stages is followed by a slough.

ARNOLD BRANCH

Inoculation Against Tuberculosis. Foreign Letter, Berlin, Langer, H., *J. Am. M. Ass.*, April 9, 1927, 1196.

In a recent address before the Berliner Medizinische Gesellschaft, Langer stated that he had succeeded in causing a resorption of killed tubercle bacilli and producing a true allergy lasting for several months. Satisfactory results have followed trial of the Langer vaccine in 120 apes. Twenty-five children have been vaccinated by Dr. Zadek and after three months' isolation were returned to their contaminated families and up to date no case of tuberculosis was developed.

ARNOLD BRANCH

The evidence is unmistakable that there is an important change in the attitude of the public toward education. There is an increasingly general demand for it in some form or other. Everywhere and in all classes of society the interest in acquiring better knowledge is apparent. Until recently people have thought of education as something for children, something which a man either got or missed in his early years, something which he generally forgot in his mature years. Now higher branches of learning are being pursued by numbers of people outside regular educational institutions. Some-

thing very significant is happening. Perhaps at no time since the thirteenth century has the desire for knowledge so nearly approached a mass movement.—E. Martin, *"The Meaning of a Liberal Education."*

On the occasion of the ceremony at the University of Sydney, when the honorary degree of LL.D. was conferred on the Duke of York, a portrait was unveiled in the Great Hall of the University of Sir Alexander MacCormick, for many years lecturer in surgery at the University of Sydney.—*News of Australia.*

Obituaries

Lieutenant-Colonel W. D. Ferris, M.B. On August 13, 1927, one of the best known of Edmonton's physicians died at the General Hospital. He had motored to the Parliament Buildings to attend the reception given to the Prince of Wales and Prince George, and while there was suddenly attacked with a heart seizure to which he succumbed shortly after his removal to the hospital. A full military funeral was held under the auspices of the 19th Alberta Dragoons, Dr. Ferris having been Lieutenant-Colonel in command of No. 6 Casualty Clearing Station, one of the militia units with headquarters in Edmonton.

Born in Shelburne, Ont., 57 years ago, Dr. Ferris graduated from Toronto University in 1898. While at the university he was prominent in athletics, being a member of the university rugby team.

In 1902 he came west to Edmonton, where he has resided since. In 1904 he was married to Miss Grace Swanzy of Toronto who is also a graduate of Toronto University and who has been prominently identified with many women's organizations in the city of Edmonton, in the formation and development of which she has borne a leading part.

During his early years in Edmonton Dr. Ferris took an active interest in medical matters and was elected President of the Edmonton Medical Association early in its history. He also was prominent in public affairs, having served for three years as a member of the School Board and for a term of years on the University Senate.



LIEUTENANT-COLONEL W. D. FERRIS, M.B.

Belonging to a family noted for its military service, Dr. Ferris was one of five brothers, all of whom served in the war; two made the supreme sacrifice, and two were wounded or gassed. Mrs. Ferris also gave splendid service having been Commandant for Ireland of the Army and Navy Canteen Corps, after serving in the same capacity in England. Going overseas as medical officer of the 66th Bat-

alion, the late Dr. Ferris was eventually appointed officer in charge of surgery at the Shorncliffe Military Hospital, where he served for a year and a half, after which, and until demobilization he was in command of No. 1, Casualty Clearing Station in France. On his return to Edmonton he was promoted to the rank of Lieutenant-Colonel in the militia forces and Commandant of No. 6 Clearing Station. For several years he acted as medical adviser to the Soldiers' Civil Service Re-establishment branch.

Since his return to Edmonton after the war it has been known to the many medical friends of the late Dr. Ferris, that he was suffering from a serious and incurable heart condition. Full well knowing that the end might come at any time, he nevertheless continued to live his usual life with its varied interests of social and community contacts and to carry on his work bravely and cheerfully without complaint or repining, showing to us all a good example of equanimity in the face of the most adverse conditions of health. "Buster" Ferris as he was familiarly known among his student confrères will not soon be forgotten by those who survive. W. H. WHITELAW

Dr. Georges Ahern for many years librarian of Laval University died in Quebec on September 3rd, at the age of forty years. His father was the late Professor Michel Ahern, who for many years was connected with the Faculty of Laval. Dr. Georges Ahern received his early education at the Quebec Seminary and the College of St. Anne's, where he graduated in 1911 with honours and the Governor's medal. After graduation he studied in the Universities of Paris and Lyon, devoting himself chiefly to surgery. On his return to Quebec City he accepted the position of assistant to Professor Dagneau at the Hotel Dieu. Later on he was appointed as a professor agrégé and assistant secretary to the medical faculty of Laval, and was given the position of assistant surgeon at the Hotel Dieu and surgeon to the Beauport Asylum. During the last few years he devoted himself especially to surgery of the nervous system. Dr. Ahern was an enthusiastic bibliophile and had one of the most complete libraries in Quebec City containing, not only a large literary and medical collection, but one of the most complete collections of Canadian literature.

He was much interested in Canadian history, and was a member of the Board of Directors of the Quebec Historical Society. He completed an important work on Canadian medical history which had been begun by his father, entitled, *Notes pour servir à l'histoire de la Médecine dans le Bas-Canada*. He was a contributor of many articles to the *Bulletin Medical*, and has published an interesting study on "*les maladies mentales dans l'oeuvre de Courteline*."

Dr. Ahern lost his wife a year ago in a hunting accident, and has been more or less an invalid since that time, although he continued his various activities until shortly before his death. He was universally beloved and retained his happy and genial spirit, abounding in wit and good humour, to the last moment. His death brings a great loss to the profession in Quebec. A. VALLÉE

Dr. Charles F. Clerk, a former well-known Montreal doctor, died in his seventy-sixth year at New Bedford, Mass. Dr. Clerk was born in Montreal in 1851 where he practised for 42 years. He retired five years ago and went to New Bedford.

Dr. Joseph Gosselin, former head of the health department of the City of Quebec, died recently. Dr. Gosselin had been ill for a long time.

Dr. H. Edwin Lewis, managing editor of *American Medicine* for nearly twenty years passed away on August 6th at his home in Ossining. Always of a literary turn of mind, Dr. Lewis founded the *Vermont Medical Monthly* shortly before his graduation, and acted as its editor for some time afterwards. He went as a national delegate to the British Congress of Tuberculosis in London in 1901. Returning to this country he continued to practise in Birmingham, and was a frequent visitor to Montreal where he enjoyed post-graduate study. In 1906 he moved to New York City and two years later took over the management of *American Medicine* from Dr. George M. Gould. Dr. Lewis' personality, knowledge and literary ability won for him many honours. He had a large circle of friends who admired his ability and respected his integrity. In spite of prolonged ill health Dr. Lewis was essentially a social man and his passing leaves a gap that will be hard to fill in the lives of many people.

Dr. James Archibald McGibbon. The untimely death of Dr. McGibbon at the early age of 43, came as a great shock to the medical profession in Edmonton.

The late Dr. McGibbon was born at Arkona, Ontario, in the year 1884. After he had obtained his preliminary education at Strathroy and London Collegiate Institutes he entered McGill University graduating in Medicine in 1908. After graduation he served as interne in the Montreal General Hospital and under Dr. Cameron in the Montreal Maternity Hospital. After coming to Edmonton, where he practised up to the time of his death, he took post-graduate study in London and Edinburgh. He was a member of the Order of Masons, Oddfellows, and Chosen Friends.

Dr. McGibbon had the distinction of belonging to a family in which there were five brothers all of whom

entered the medical profession. His surviving brothers are Dr. Salton McGibbon of Edmonton, Dr. Donald McGibbon of Los Angeles, Dr. Peter McGibbon, M.P., of Bracebridge, and Dr. George McGibbon of Honeywood, Ontario.

T. H. WHITEHEAD

Dr. Alexander McKenzie died in Ottawa on September 5th. He was a descendant of Sir Alexander McKenzie and the only child of the late Dr. Edward McKenzie, who called him after his famous predecessor. During his life he was familiarly known as "Sir Alexander". Dr. McKenzie was born in Pembroke, but when quite young moved to Smith's Falls. He graduated from the Royal Military College and later received the degree of M.D. from McGill University. Dr. McKenzie was also interested in civic affairs and for a number of years served as a member of the Town Council in Smith's Falls, and for four terms as Mayor.

Dr. John Noble died in Toronto, in September, after an illness of two weeks' duration. Dr. Noble, who was a well known medical man, was born in Orangeville seventy-three years ago. On his graduation he began the practice of his profession in Toronto. In addition to carrying on his medical practice, Dr. Noble represented Ward 2 as an Alderman for four years, and also served on the Board of Health.

Dr. Sharp died in Tilbury late in August. Well known in the district as a result of his social and political activities, Dr. Sharp had practised without interruption in Tilbury for over thirty-five years. As a mark of respect to the late doctor all places of business in Tilbury were closed for the afternoon. In the passing of Dr. Sharp the town has lost one of its most respected members.

Dr. W. A. Lowe, died at Sault Ste. Marie early in September.

News Items

GENERAL

TENTATIVE PROGRAMME OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

The thirty-eighth annual meeting of the Association of American Medical Colleges will be held in Montreal on October 24, 25, 26, 1927. The morning meetings will be held in the Assembly Hall of the Faculty of Medicine, 3640 University Street.

MONDAY, OCTOBER 24TH

9.30 a.m.—Teaching of Psychology in the Medical Course.

E. A. Bott, University of Toronto.

Teaching of Obstetrics.

W. W. Chipman, McGill University.

Discussion to be led by Dr. J. M. H. Rowland, University of Maryland.

Teaching of Anatomy.

J. C. B. Grant, University of Manitoba.

Medical Education as it Strikes an Anatomist.

H. von W. Schulte, Creighton University.

Place of Living Anatomy in Medical Schools.

Eben J. Carey, Marquette University.

Discussion to be opened by Professor S. E. Whitnall, McGill University.

Some Aspects of a Graduate School of Medicine.

William D. Cutter, New York Post Graduate Medical School.

The Administrative Personnel of a Medical School.

G. Canby Robinson, Vanderbilt University.

Further Report on Specialization in Medicine.

H. G. Weiskotten, Syracuse University.

At the conclusion of the morning programme, a short tour of the Medical Building will be arranged and

visits made to the Department of Anatomy, the Bindery, the Photographic and Art Department, the Osler Library Room, etc.

1.30 p.m.—Luncheon—Royal Victoria Hospital (adjacent).

2.30 p.m.—Visit to the Gynecological and Obstetrical Teaching Pavilion, the University Medical Clinic and the Pathological Institute.

Short Address on Teaching of Pathology.
Prof. H. Oertel, McGill University.

6.30 p.m.—Subscription dinner—Mount Royal Hotel.
Address of welcome by Sir Arthur Currie, Principal of McGill University.

Demonstration of "underseas" film presented by Dr. Paul Bartsch, of the Smithsonian Institution, Washington, D.C.

TUESDAY, OCTOBER 25TH

9.30 a.m.—Discussion on Extra-Mural Clinical Teaching.
C. R. Bardeen, University of Wisconsin.
Hugh Cabot, University of Michigan.
L. S. Schmitt, University of California.

Teaching of Medicine.

J. C. Meakins, McGill University.

Teaching of Physical Diagnosis.

Duncan Graham, University of Toronto.

Teaching of Internal Medicine along Phylogenetic Lines.

Charles P. Emerson, Indiana University.

Discussion to be led by Professor C. P. Howard, McGill University.

Further Report on Applicants for Matriculation into Medical Schools.

Burton D. Myers, Indiana University School of Medicine.

1.30 p.m.—Luncheon—Montreal General Hospital. A short tour of the Institution and short address on Teaching Methods.

3.00 p.m.—Visit to the building of the Biological Sciences, McGill University.

6.30 p.m.—Dinner—Mount Royal Hotel—to be followed by an Executive Session, with reports of Secretary, Executive Council, etc., Round-table discussion on Methods of Teaching.

WEDNESDAY, OCTOBER 26TH

Coördination and Strengthening of Pre-Medical Training as a Means of Improving a Candidate for Medicine.

Clyde Brooks, University of Alabama.

The Problem of Junior Medical Teaching.

J. Jay Keegan, University of Nebraska.

9.30 a.m.—What to Teach and What to Skip.

Hilding Berglund, University of Minnesota.

Demands on the Medical Practitioner in the South during a Period of One Year.

C. C. Bass, Tulane University.

An Experiment in the Teaching of the History of Medicine.

J. M. H. Rowland, University of Maryland.

An Experiment with the Curriculum.

Lawrence H. Baker, John Hopkins University.

Further Report on Women in Medicine.

Martha Tracy, Women's Medical College of Philadelphia.

Coördination of Medical Problems: Medical Education: Public Health Hospital.

Charles S. Butler, Commandant, Naval Medical School.

THE OFFICERS OF THE ASSOCIATION ARE:

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Vice-President: Guy L. Noyes, University of Missouri.

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Executive Council: Walter N. Niles, Chairman; Irving S. Cutter; Charles P. Emerson; Charles F. Martin; Ray Lyman Wilbur; Hugh Cabot; Fred. C. Zapffe.

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NOVA SCOTIA

Dr. A. G. Nicholls, lately Professor of Pathology in Dalhousie University and Provincial Pathologist, resigned from both these positions about a year ago but carried on his teaching work in the university until a successor could be appointed to replace him. He has now decided to take up his residence in Montreal, as his two elder sons are attending McGill, and the youngest, the Montreal High School. Dr. Nicholls has spent about twelve years in Halifax, and, apart from his relationship to Dalhousie University and the Victoria General Hospital, has been active in many directions. He was the founder of the Osler Medico-Historical Club of Halifax. The new patho-

logical building was largely of his planning, and has proved to be both suitable and convenient. Dr. Nicholls has undoubtedly left his mark on the medical education of this province. Still more, he has won the esteem and admiration of a large circle of friends, who deeply regret his loss not only to the university but to the community, and who follow him with the best of good wishes.

Dr. Ralph P. Smith arrived in Halifax late in August to take up his work as professor of pathology at Dalhousie University and pathologist to the Victoria General Hospital. A pleasant dinner was arranged at

the Ashburn Golf Club, to enable him to meet the hospital clinicians and other members of the Halifax profession.

The 1927-28 session of the Dalhousie Medical School opened on the fourteenth of September, with an unusually large registration. There have been several changes in the teaching staff. Dr. R. P. Smith and Dr. H. M. Jamieson take the places in the Department of Pathology vacated by Drs. A. G. Nicholls and D. J. Mackenzie, and Dr. G. S. Eadie assumes the position in physiology formerly occupied by Dr. N. B. Dreyer.

The corner stone of the new building for the Pictou Memorial Hospital was laid late in August by the premier of Nova Scotia, the Honourable E. N. Rhodes. The townspeople made a special day of the occasion, and a programme of varied events attracted many visitors. Incidentally the supporters of the hospital found opportunity to add substantially to the finances of the institution.

A recent visitor to Nova Scotia was Dr. Frederick S. Dennis, of New York, whose System of Surgery is so well known. While he was at Sydney, Dr. John K. McLeod, a former student under Dr. Dennis at Bellevue Hospital Medical College, arranged for a very pleasant reunion of a number of other former students and included Dr. Wm. McK. McLeod who was a class mate of Dr. Dennis's. A most enjoyable evening was spent in recalling the experiences of college days and discussing the changes which the intervening years have brought forth.

Under the Canadian Medical Association scheme for extra-mural post-graduate instruction, Drs. H. B. Cushing and L. H. McKim, of Montreal, are to address branches of the Medical Society of Nova Scotia at Amherst, New Glasgow, Antigonish, Sydney, Halifax, Annapolis Royal, Yarmouth, Bridgewater and Truro. The Amherst meeting is to be held on September 19th, and the others will follow on succeeding week days with the single exception of the Truro meeting, which has been arranged for September 30th. Two sessions will be held at each place.

Summer camps for undernourished children have become quite popular in Nova Scotia. The Kiwanis clubs of Sydney and Yarmouth have each established such a camp, and so has also one of the Halifax evening papers. Another Halifax paper maintains a camp to which tired mothers may go with their children for a short period of rest and recreation. All these camps are very well conducted, and are undoubtedly accomplishing much good. A careful medical examination is made of each child before admission to the camp, and any possible carrier of infection is rejected. Preference is given to those whose health is most likely to be benefited. An unfortunate accident happened recently at one camp, when a little girl, while bathing in the sea, was carried out by the undertow. Miss Madge Cruise, the nurse of the camp, rushed to the child's rescue, but she was unable to contend with the undertow and both child and nurse were drowned.

Dr. L. M. Silver has, to the great regret of all concerned, resigned his positions as visiting physician to the Victoria General Hospital and professor of medicine and clinical medicine at Dalhousie University. He remains on the medical board of the hospital, and has been appointed to the consulting staff of that institution. His retirement from the visiting staff was marked by a complimentary supper tendered by Mr. Kenney, superintendent of the hospital, who spoke in terms of admiration of Dr. Silver's splendid service of more than twenty-five years, and of his well recognized ability both as a clinician and as a teacher. These sentiments were echoed by several members of the profession. In responding to an enthusiastically received toast, Dr. Silver sketched the advances which had been made in the hospital during his term of service, and spoke of the happy harmony which had always prevailed amongst the personnel.

The refresher course for physicians, which has been arranged by the Dalhousie medical faculty for a number of years past, was carried on this year from September 5th to 9th. There was a feeling that the visitations of local medical societies by extra-mural lecturers of the Canadian Medical Association would have the effect of reducing attendance at the Dalhousie course, and the decision to put on a course this year was reached hesitatingly and only a few weeks ago. The event proves that the fear of a small attendance was unfounded, and the registration compared very favourably with other years. As has been the custom of late years, with the consent and co-operation of the Canadian Medical Association, the Dalhousie faculty asked the assistance of representatives of other medical schools, and Dr. L. J. Austin, of Queens, Dr. R. E. Powell of McGill, and Dr. R. D. Rudolf, of Toronto, each gave three lectures which were all greatly enjoyed. In addition, the faculty was fortunate in securing a lecture by Dr. B. M. Randolph, of the George Washington University. All lectures were given in the afternoons. The morning of each day was fully occupied with clinics at various hospitals, conducted by members of the Dalhousie faculty. Many expressions of appreciation were heard from those in attendance, and the opinion appeared to be general that the course throughout had been unusually well arranged and that the material provided was admirably suited to the needs of the general practitioner. Several physicians from New Brunswick, Prince Edward Island and Newfoundland, one from Venezuela and one from Korea, were in attendance.

Dr. J. G. McDougall, of Halifax, is at present in the United Kingdom.

Dr. J. Emile LeBlanc, of West Pubnico, was elected first vice-president of the National Congress of Acadians which met at Moncton, N.B., in August.

Dr. W. F. Read, of Digby, is to leave Nova Scotia shortly to assume the position of medical adviser to Colgate University. Dr. Read's departure will be greatly regretted, but he will take with him the best wishes of his Bluenose colleagues. W. H. HATTIE

NEW BRUNSWICK

Eight nurses were graduated from the Hotel Dieu Hospital, Chatham, on September 13th. Dr. J. B. McKenzie, F.A.C.S., made the address to the graduates.

Dr. L. DeV. Chipman of Saint John, with the assistance of Dr. E. T. Kennedy and Dr. L. R. Murray of Sussex operated upon thirty-three tonsil and adenoid

cases at Sussex on August 25th. The clinic was sponsored by the Pythian Sisters.

The death of Mrs. L. M. Curren was an unexpected shock to the many friends she numbered among the medical profession of New Brunswick. Her death leaves a place hard to fill in the musical life of Saint

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John. Much sympathy is expressed for Dr. Curren and family.

Dr. Margaret Parks of the Canadian Immigration Department, has been promoted to a position overseas, but will spend a short holiday with her relatives in Saint John before proceeding to England.

Among the many visitors to New Brunswick this summer we were pleased to note Dr. Walter Barlow, Dr. Ralph Powell and Dr. D. W. MacKenzie of Montreal.

Under the patronage of Dr. H. I. Taylor, provincial Minister of Health, the Provincial Bureau of Health met in Saint John, August 24th and 25th; many matters of interest were discussed. Among these was the establishment of a chemical laboratory. Dr. H. L. Abramson spoke strongly in favour of such a move and suggested that such a laboratory should properly be placed at Saint John, in relation to the General Public Hospital.

Dr. G. G. Melvin, chief medical officer spoke on birth registration and the advisability of a provincial census of the mentally defective. Dr. Wm. Warwick of Saint John, Dr. O. E. Moorehouse of Keswick, Dr. F. J. Desmond of Newcastle, and Dr. D. J. Landry, of Buctouche discussed the late scarlet fever epidemic as well as reported various local difficulties. Dr. Mable Hanington addressed the members of the bureau on the care and problems of handling the mentally defective child. On the evening of the 24th of August the delegates were the guests of the commissioners of the Saint John County Hospital, at dinner. The repast was followed by a scientific session at which Dr. H. A. Farris spoke on "Tuberculosis," and "The relation of the hospital to the municipalities."

The August extra-mural lecturers for New Brunswick were Dr. R. G. Armour of Toronto, whose topic was "Borderline cases of mental disease", and Dr. H. A. Dixon of Toronto, who spoke of "Some common

skin diseases". Dr. Armour has a happy faculty of making a difficult and confusing subject understandable to the practitioner and from all over the province the reports of his lecture are most flattering. Dr. Dixon's therapeutic advice for the lesions discussed and his excellent slides were very welcome. These gentlemen appeared at Woodstock, Fredericton, Saint John, Moncton and Campbellton.

Dr. George Skinner of Saint John had the misfortune to fracture his forearm last month; he is reported almost recovered.

Dr. A. B. Walter of Cambridge was a patient in the Saint John Infirmary for a few days, but is now convalescent after a minor operation.

Work has been begun on a proposed extension to the Provincial Hospital for Mental Diseases; at present the plans are approved for a wing to house female patients and later an addition for males is contemplated. Dr. Anglin is to be congratulated on having obtained this much needed extension.

The associated Workmen's Compensation Boards of Canada met in Saint John during the week of September 12th, at which Dr. A. Stanley Kirkland of the General Public Hospital, Saint John, gave an address on "Industrial Fractures, with Special Emphasis on Spinal Injuries." Dr. G. G. Corbet, medical adviser to the New Brunswick Board read a paper on "Compensation Problems."

The following physicians have qualified for promotion to the rank of Lieut.-Colonel in Military Department No. 7: Major A. J. Lozier of Chatham, of the No. 14 field ambulance C.A.M.C.; Major C. M. Pratt, Saint John, No. 14 field ambulance C.A.M.C.; Major D. C. Malcolm, M.C., Saint John, No. 1 General Hospital and Major R. A. Hughes, C.A.M.C.

A. STANLEY KIRKLAND

QUEBEC

Professor John Beattie, M.D., M.Sc., has been appointed as Assistant Professor of Anatomy under Professor Whitnall. Professor Beattie was for many years connected with University College, London, England, both in the Department of Histology and of Anatomy, and more recently has been Prosector at the Zoological Gardens, London. He has already contributed to many scientific journals articles on the "Anatomy of the Common Marmoset", "The Lymphatic Drainage of the Thoracic and Upper Abdominal Viscera", etc.

Professor H. S. Birkett, Emeritus Dean of the Faculty of Medicine, McGill University, was recently made an Honorary Member of the American Academy of Ophthalmology and Otolaryngology. He was the guest of honour at the annual meeting in Detroit on September 12th, where he gave as his oration a paper on "Buller the Ophthalmologist; Politzer the Otolologist and Lefferts the Laryngologist."

About 650 applications for entrance into the first year of the Medical Faculty have been received up to date. These applications have come not only from the American Continent but from the British West Indies, Great Britain and the Continent.

We notice that a special series of lectures will be delivered in the large amphitheatre of the Medical

Faculty of the University of Montreal by Professor Emile Sergent of the University of Paris on "Diseases of the Bronchi and Lungs." The lectures will be given on Mondays, Wednesdays and Fridays beginning October 10th. The opening lecture on Exploratory Methods in the Respiratory System was given on October 3rd.

The Province of Quebec Medical Association held its "Clinical Day" in Montreal on Tuesday, September 27th. The programme called for clinics at three hospitals, beginning with a morning session at the Hôpital du Sacré Coeur at Cartierville where several interesting cases of tuberculous infections were shown. The afternoon was occupied with clinics at the Montreal General and Royal Victoria Hospitals given by the teaching staff of McGill University; and in the evening a subscription dinner at the Mount Royal Hotel was followed by a session devoted to the discussion of professional interests.

The 28th annual meeting of the American Roentgen Ray Society was held in Montreal from September 20th to 23rd. Dean C. F. Martin of McGill University welcomed the visit of the Society to Montreal, after which there was the installation of the President-Elect, Dr. A. Howard Pirie of Montreal. Papers covered a great variety of subjects and reflected the extent to which the x-ray has become a necessary part of diagnostic technique.

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Sir Thomas Oliver, an important authority on industrial diseases, met in conference a group of medical men at McGill University, lately, to discuss health services in industry. Sir Thomas, who was here on a brief visit, was enthusiastic over the plans for the department of public health and preventive medicine which is to be inaugurated this year in the Faculty of Medicine at McGill, under the directorship of Dr. A. Grant Fleming. He expressed the hope that this would mark the beginning of great advance in this work at the University. He visited some of the industrial plants in Montreal, where health services were

in operation and showed great interest in the work that is being done. Sir Thomas was accompanied by Dr. Hofman, insurance statistician. It was due to Sir Thomas that lead poisoning in industry was checked and is now no longer a menace to the industrial workers in Great Britain. It was also largely due to his influence and investigation that red phosphorus formerly used to a great extent in the manufacture of matches was done away with, thereby ensuring the safety of those employed. Previously, it had been the cause of dire disfigurement and disease in those employed.

GEORGE HALL

MANITOBA

A forward step in the improvement of public health conditions in Manitoba was taken when Dr. E. W. Montgomery, Professor of Medicine in the University of Manitoba, was sworn in as Minister of Health and Public Welfare on September 8th, by Chief Justice W. E. Perdue in the presence of Premier Bracken, and other cabinet ministers and a number of medical men. Premier Bracken expressed his pleasure at having a man of Dr. Montgomery's experience and influence assume the portfolio of public welfare. The purpose of the government, he said, was to bring under one portfolio all the health and public welfare activities that are now under different departments. These include the provincial Board of Health, the governing boards of the various hospitals throughout the province, and societies supervising mothers' and child welfare.

Dr. Montgomery was born in eastern Quebec. He came to Manitoba at an early age, and in 1886 graduated in arts from the Manitoba college. He then entered upon the study of medicine, and after graduation commenced the practice of medicine in Winnipeg.

In 1895, Dr. Montgomery joined the staff of the Winnipeg General Hospital, and he has been actively associated with the growth and success of that institution. When the teaching in the Manitoba Medical College was taken over by the University, Dr. Montgomery was appointed professor of medicine. He has contributed many papers of value to various medical associations in Canada and the United States. In 1922, he was chosen as president of the Canadian Medical Association.

For many years Dr. Montgomery was associated with Dr. Gordon Bell as a member of the Board of Health, and is to-day carrying out the plans which were early outlined in that association. The sanatorium for consumptives was founded under the auspices of that board. A charter member of the board, Dr. Montgomery acted on the site committee, which finally chose Ninette as the location of an institution, which under Dr. David Stewart, is now reflecting great credit on the Province of Manitoba.

Dr. Montgomery has always been a keen observer and a tireless and retentive reader, and these two faculties have gained him a favourable position in the

medical world as a diagnostician. He is also keenly interested in botany and horticulture.

The Brandon and District Medical Society held a successful meeting at Souris on September 1st. The visiting speakers were Dr. N. J. Maclean and Dr. O. J. Day of Winnipeg who gave addresses on "Peptic ulcer" and "Infantile diarrhoea" respectively.

At the meeting of the North Western Medical Association at Virden on August 23rd. Dr. and Mrs. M. C. O'Brien of Birtle were presented with a silver vase in commemoration of their twenty-fifth wedding anniversary. Mention was made of the high regard in which the couple were held, and the valuable work done by Dr. O'Brien as President and Secretary of the Association.

Dr. T. G. Hamilton of Winnipeg addressed the Brandon and District Medical Society on October 12th, taking as his subject "Psychic research."

A clinic for the immunization of children of pre-school age against diphtheria by means of toxoid has been recently opened at the Children's Hospital.

The corner stone of an addition to the Shriners' Hospital for Crippled Children, Aberdeen Avenue, Winnipeg, was laid on September 16th, by the Grand Master and officers of the Grand Lodge of Manitoba. The addition will bring the number of beds to thirty. The estimated cost is \$22,000.

Dr. J. W. Bridges, instructor in abnormal psychology at McGill University delivered an address on "The mental hygiene movement" at the luncheon of the Kiwanis Club of Winnipeg on August 30th.

The executive of the Manitoba Association has approved a plan of group insurance to be put into execution by the Ryan Agency whereby adequate protection in suits of malpractice can be procured at a rate much below the ordinary.

ROSS MITCHELL

SASKATCHEWAN

Dr. J. J. Collins, L.M.C.C., graduate of Queen's University, 1927, has begun practice at Wakaw, Sask.

Dr. S. H. McLeod, who has been practising at Langham, Sask., is moving to Coronation, Alta.

Dr. A. L. Caldwell, of Evansburg, Alta., will open an office at Cabri, Sask., early in October.

Dr. G. R. Peterson, F.R.C.S., and Dr. A. F. Malloy, both of Saskatoon, have returned from an extended visit in Europe. While there they attended several of the larger clinics.

Dr. P. J. Carroll, who was formerly at Neville, Sask., is now practising at Clairholm, Alta., in partnership with Dr. McMillan.



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Dr. H. A. Matheson, who for several years practised at Asquith, is now located at Saskatoon.

Dr. E. J. Bennett, formerly of Cabri, Sask., is now practising in Winnipeg, Man.

At the annual meeting of the College of Physicians and Surgeons of Saskatchewan, Dr. E. R. Myers, Saska-

toon, was appointed President, Dr. H. E. Eaglesham, Weyburn, Vice-President.

During the last few weeks several towns throughout Saskatchewan, have been making enquiries in the hope of obtaining a doctor to locate in their districts. Any doctor wishing a location, should communicate with Dr. A. MacG. Young, Registrar, College of Physicians and Surgeons, Saskatoon.

BRITISH COLUMBIA

A large number of medical men had the pleasure of hearing the Hon. Dr. J. H. King give an address at the Georgia Hotel at a luncheon meeting on August 15th, arranged by the British Columbia and Vancouver Medical Associations. Dr. H. E. Ridewood, of Victoria, was in the chair and introduced Dr. King as the Minister of Health for Canada.

Dr. King gave a succinct report of the activities of the Federal Department of Health. This is a new department, having been inaugurated in 1920, and has many functions, all of great importance to the national life. The first function to which he referred was that of quarantine. Canada, in uniformity with thirty-four other countries, has a very complete system of quarantine, and maintains four stations, the one at Williams Head being well known to British Columbians, and described by Dr. King as one of the best in North America.

Another great department of his work is that connected with immigration, especially as regards the selection of those who are fit, mentally and physically. Until last year examination of immigrants was conducted entirely at the port of disembarkation in Canada, but Dr. King's Department has been able to persuade the government that examinations should be conducted at the ports of embarkation, and Dr. King gave some very interesting figures as to the greater efficiency thus obtained. For instance, in 1925, Dr. Laidlaw of Alberta reported that of the 1,920 insane patients in Alberta, 79 per cent were foreign born, costing an annual sum of \$250,000 to Alberta alone. The same percentage obtains throughout the west, whereas in Ontario, where immigration is small, only 39 per cent are foreign born.

Examining 20,000 immigrants in Great Britain, the department discovered 10 per cent of these to be unfit, whilst previously, of 115,000 landed in Canada and examined there, only half of 1 per cent were discovered to be unfit, owing to examinations being performed hurriedly and inadequately. The department proposes to send twenty-five Canadian doctors to Great Britain and Ireland to conduct thorough examinations before immigrants are allowed to proceed. This is obviously kinder to the immigrants as well as infinitely better for Canada.

Dr. King then touched on the Food and Drugs Act, which, he stated, is one of the best in any country. Under this Act inspectors are employed throughout Canada. A laboratory is maintained at Ottawa and dealers guilty of fraud or substitution are prosecuted. Dr. King then took up the Opium and Narcotic Act which has recently been amended in concert with other countries under the League of Nations programme. There are at present 8,000 addicts in Canada and the number of these is decreasing rapidly under the strict administration of the Act. Dr. King uttered a serious warning to those in the medical profession who, led astray at times by a mistaken sentiment of pity, are guilty none the less of breaches of this law. He stressed the necessity for

institutional treatment of addicts, and emphasized the intention of his department to enforce the law in this regard to the utmost of his ability.

Other functions of the department are Sanitary Service on the Great Lakes of the St. Lawrence with a view especially to prevention of typhoid. This work is productive of much good. Inasmuch as matters of health are primarily in the control of the provinces, the Federal Government has to exercise great care not to infringe on provincial prerogative. Accordingly, the Dominion Council of Health has been organized, composed of Provincial Health Officers and representatives of the Federal Board and this Council meets every six months at Ottawa with a view to unifying administration in health matters. Dr. King paid warm tribute to the Provincial Health Officers and their work.

Other public bodies of semi-official standing are those connected with mental hygiene, child welfare, the Red Cross, tuberculosis, venereal disease and the St. John's Ambulance Association. Grants are made by the government to each of these bodies and the Federal Department keeps a certain amount of control to prevent overlapping and waste of effort.

There has been a great awakening in public health matters throughout Canada in recent years. Universities are educating public health nurses, and the medical profession is awakening to a friendlier and more co-operative view of public health service. Canada, Dr. King said, was in the forefront of the nations as regards public health, though she is a young country, and small in population. He concluded by urging the medical profession to keep in touch with the development in public health. This is especially important, he pointed out, in Vancouver which is a great and growing port and is faced with problems of great magnitude which are being thrust upon it rapidly and with little preparation.

Dr. King received a great ovation at the end of his speech and a vote of thanks was proposed by Dr. R. E. McKechnie, seconded by Dr. A. B. Schinbein, President of the Vancouver Medical Association. Dr. McKechnie drew attention to the responsibility that lies on the medical profession as educated men who have received most of their education at the public cost, to repay to some extent this obligation by doing their share of public service and he pointed to Dr. King as a noble example in this field.

The second extra mural post-graduate tour throughout British Columbia, given under the auspices of the Canadian Medical and British Columbia Medical Associations commenced on September 1st, at Fernie, B.C. At time of going to press we can only report this one meeting. It was the first medical meeting ever held at Fernie and judging by the excellent attendance and appreciation of the doctors in the East Kootenay district, the selection of this town was well justified.

It was a privilege to have such teachers as Dr.

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A. Primrose, Dean of the Medical Faculty and Associate Professor of the University of Toronto, Dr. Duncan Graham, Professor of Medicine of the same university and Dr. W. B. Burnett, Gynaecologist of the Vancouver General Hospital. That their subjects were well chosen was evidenced by the keen attention of those present and the discussions which followed. Dr. A. Primrose spoke on "Inflammation and tumours of the breast," and shewed some very interesting slides in connection therewith. Dr. Duncan Graham on "Constipation," and at a later session "The anæmias," also showing quite a number of instructive slides on both subjects. Dr. W. B. Burnett gave a very valuable talk on "A few obstetrical emergencies."

It may perhaps adequately express the recognized value of these post-graduate courses when one realizes the immense distances many of the doctors travel to avail themselves of this teaching. Dr. F. E. Coy of Invermere motored some 140 miles (each way) and Dr. G. B. Henderson of Creston, a similar distance. Ninety-five per cent of available men were present.

At the close of the clinical sessions Dr. W. B. Burnett gave an eloquent address on the aims, objects and value of the Canadian Medical and British Columbia Medical Associations, whilst the Executive-Secretary, Mr. C. J. Fletcher, also dealt with economic problems confronting the profession in British Columbia.

A banquet was tendered all the visitors by the local doctors at Fernie after which the annual meeting of the local Association was held when the following officers were elected for the ensuing year: Dr. F. W. Green, Cranbrook, President; Dr. G. B. Henderson, Creston, Vice-President; Dr. F. E. Coy, Invermere, Hon. Sec.-Treasurer; Dr. J. H. Blair, Fernie, Dr. Geo. A. E. Kelman, Fernie, and Dr. M. E. Tiffin, Kimberley, members of the Executive; Dr. Douglas Corsan, Fernie, representative on Executive of the British Columbia Medical Association.

It was indeed an epoch making day and will be long remembered by those doctors who were fortunate enough to be present. The other meeting will be reported in the next issue of the *Journal*.

Dr. Roy Walker of Logan Inlet, B.C., is now practising in Pentteton.

Dr. Robert Crosby, who has been absent in Europe for several months returned to Vancouver at the end of August and has resumed practice.

Dr. J. Bakes, Primarius of the Surgical Clinic at Brunn, Czechoslovakia, was a recent visitor in Vancouver on his way to Northern British Columbia on a big game hunting expedition.

J. EWART CAMPBELL

Book Reviews

Text-Book of Pharmacology. A. D. Bush, B.S., M.D. 181 pages. Price \$2.00. P. Blakiston's Son & Co., Philadelphia, 1927.

The author's aim has been to present the essentials of the subject in as concise and practical a manner as possible.

The book is divided into three parts. Part I deals with the important drugs of the United States Pharmacopœia; Part II, with new and non-official remedies; and Part III with prescription writing, incompatibilities, solutions, etc. Under each drug is listed its important preparations. There is a brief statement of where and how the drug acts wherever this is definitely known. Greater emphasis is placed on therapeutic usage, symptoms produced or allayed, side actions to be expected and toxic effects from excessive dosage, thus making the book a very practical one. Facts only are considered. There is no discussion of theories or presentation of experimental evidence. There are no illustrations. Only the United States Pharmacopœial nomenclature and dosage is given.

The busy practitioner will find this text a source where he may quickly review the important actions and usage of a drug he may wish to employ.

W. G. MACKERSIE

Practical Lectures on the Specialties of Medicine and Surgery. The Medical Society of the County of Kings, Brooklyn (second series 1924-26.) 590 pages, 110 illustrations. Price \$7.00. Paul B. Hoeber, New York, 1927.

Since 1922 the Medical Society of the County of Kings, Brooklyn, has arranged each spring and fall a course of ten lectures on subjects of practical value to the doctor in general practice. They are along the lines of those which have been given for several years by the

Ontario Medical Association before county societies. So popular have these been that the large auditorium of the society has been crowded, and even the newspapers have told the public of the doctors going back to school to brush up in their work to keep abreast of the latest advances in medical science.

Thirty-seven of the lectures of the last two years appear in this volume. The subjects are varied but are all of the type which will appeal to the general practitioner, including medicine, pediatrics, obstetrics, surgery, public health, immunology, physiotherapy and other departments of practice.

The lectures are printed in attractive form, some are well illustrated; all are instructive and easy reading. They give a summary of current thought and practice, and should prove a valuable addition to the physician's library.

The Medical Society of Kings is to be congratulated upon the choice of subjects, upon its choice of lecturers and upon the form in which the lectures are presented to the profession at large.

J. H. ELLIOTT

A Text-Book of Histology, arranged upon an embryological basis. Frederic T. Lewis and J. L. Bremer. 551 pages. 485 illustrations. Philadelphia, P. Blakiston's Son & Co., \$6.00.

This is a revision, by Dr. J. L. Bremer, Associate Professor of Histology at the Harvard Medical School, of the second edition of Lewis and Stöhr's Histology, based on the fifteenth German edition of the *Lehrbuch der Histologie* originally written by Philipp Stöhr of Würzburg. Even the first edition of Lewis and Stöhr's book differed materially from its German original, and now, when we compare the Bremer version with the current edition (20th) of the German text (revised by Wilhelm von Möllendorff of Kiel in 1923) we have to

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Bremer has made notable improvements. The endocrines are now grouped together, as they should be. There are numerous additions from the more recent contributions in the very active field of cytological investigation, including the newer views on mitochondria, and other cytoplasmic constituents, and on the physical characters of protoplasm. The results of such revolutionary methods of research as tissue culture and microdissection have their place, and the modern conceptions of the significance of chromosomes are set forth. There is up-to-date matter on a host of subjects, such as the function of osteoclasts (Arey), the origin of the sympathetic nerves of the intestine (Kuntz), the structure and function of the capillaries (Krogh), the growth of lymphatics (Elliot Clark), the hormones of the ovarian follicle (Allen and his confrères), oestrus (Stockard and others), and the islets of Langerhans (Banting). "Insulin" is not mentioned, and we look in vain for any mention of Collip and "parathyrin".

The red corpuscles are still thought to be typically cup-shaped, within the vessels. One might wish for a fuller treatment of the macrophages, and also of the intestinal epithelium, an important constituent of which, the basal granular, or enterochromaffin cell, is not even mentioned. The illustrations are generally clear, and not a few are in colour. A few of the figures, however, might be improved, as in the cases of the thyroid, thymus and hypophysis. The diagram (Fig. 277, p. 302) 'purporting to show the terminal branches of a bronchiole, is apt to be misleading. It does not give the modern conception of this.

The Lewis edition of Stöhr has always been notable for its use of the embryological approach to the study of histology, and this valuable feature is retained in the Bremer edition. There is even more stress than heretofore on the optical evidences of the functional activities of the cells. Attempt is made to develop the student's habit of reference by the citation of notable original articles. Certain matter on the brain and the development of the cranial nerves has been omitted, since this is modernly dealt with in works on neurology. There is a valuable section on the use of the microscope, in which emphasis is laid on the necessity for constant focussing up and down when using the high powers, in order that the third dimension may be appreciated. There is a good section on technique.

On the whole it may be said that Bremer has made a brave attempt to bring this work up-to-the-minute, so that it may be used as a guide for students in medicine and in other biological sciences, and in this he has been successful. Thus we would welcome the book heartily, as a distinct advance in its rapidly-growing field.

C. C. MACKLIN

Text-Book of Bacteriology. William W. Ford, M.D., Professor of Bacteriology, School of Hygiene and Public Health, Johns Hopkins University. Illustrated, 1,069 pages. Price, \$8.50. W. B. Saunders Co., London and Philadelphia; McInish & Co., Toronto, 1927.

This volume is of particular interest to some of us of the older generation in Montreal, who well remember Dr. Ford, when he was a research scholar at McGill under the late Prof. J. G. Adami. The foundation there laid has been well and substantially built upon, and the volume in hand exhibits in large measure the personal work of the author during many years in his chosen field. Dr. Ford's book while intended primarily for the medical student and medical bacteriologist, is a large one, perhaps too large for the scientific well-being of the average pupil; for those who have some previous general knowledge of the subject the matter is presented in a logical, complete, and pleasing way. Amid

the welter of heterogenous and undigested observations the author has done well to select those that are of importance to the medical man, the hygienist, and the industrial bacteriologist.

In its scope and arrangement the work reminds us strongly of one of the earliest, and for its time one of the best, text-books on bacteriology—that of Sternberg. The plan is excellent. There is a short, but adequate, historical introduction, dealing with the development of the microscope and the controversy on spontaneous generation. The morphology and life history of bacteria are then taken up. Methods of cultivation and destruction are dealt with, and there is a very useful chapter for the advanced worker on the staining reactions of bacteria, giving many well-tryed formulae. The greater part of the book is, of course, devoted to systematic bacteriology. The classification adopted is, in the main, that of the American Society of Bacteriologists, with some additions. As this involves a new, even if a more uniform and scientific terminology, the older, well-established, names are also given. The type of illustration adopted is the camera lucida drawing, reduced to a uniform scale, which proves quite satisfactory. The information given about the various species is full, notably in regard to cultural peculiarities, and there is an adequate bibliography. Under *Neisseria meningitidis*, we note that a culture medium, in wide use in English and Canadian laboratories, and, in the reviewer's opinion, the best of them all, namely, trypsinized broth or agar, made from beef heart, on a pea-extract basis, is not mentioned. There are two useful chapters on personal and environmental bacteria. Infection and immunity are adequately dealt with, including a chapter on the bacteriophage, or Twort-D'Herelle phenomenon. The book ends with an up-to-date consideration of the spirochaetes and infectious micro-organisms of undetermined character.

If a suggestion may be made, it would be helpful to the student if a table were inserted, giving in a concise form the classification adopted. All taxonomy is a bugbear, and that of bacteriology has become quite bewildering.

There are rather more than the permissible number of printer's errors, and an occasional misspelling, which will, no doubt, be corrected in a subsequent edition. To sum up, this is a work which is adequate, scientific, and well presented, and deserves little but praise.

A. G. NICHOLLS

The Conquest of Disease. Thurman B. Rice, A.M., M.D. 363 pages. Price \$5.00. The Macmillan Co. of Canada, Toronto, 1927.

In view of the high death rate from cancer, heart disease, cardio-reno-vascular disease, pernicious anemia and many other forms of disease presented to the reader in this volume, we feel that the title of this book may be regarded as somewhat of a misnomer. Still, much has been done in the way of the conquest of disease, and this book presents a review of what has been accomplished and is well worth a perusal by every medical man. Further than that, this book should be read by the public at large. I venture to say the advances made in our knowledge of disease are far from being generally known; if known there would be less consideration shown for the untrained and irregular practitioner.

The book is divided into three parts. Part I, Introductory, going into the history of the serious epidemics of the past, with two very interesting and important chapters, "A", Infection and Resistance, "B", How we catch Disease.

Part II gives a concise account of what has been accomplished in the control and prevention of disease. Under "The Prevention of Typhoid," the value of vaccination might have been stressed more than it is. If we could only educate the public to a general vac-

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cination against typhoid (which could be done at a very small cost), we would then realize that "vacation time is not typhoid time." Part III deals with vital statistics and general public health matters.

This book contains little new for the medical man, but is well written, very convenient in size and should I think, be so placed that the general public could have access to it. FRED. J. HART

Segregation and Autogamy in Bacteria. F. H. Stewart, M.A., D.Sc., M.D. 104 pages, 7 illustrations. Price 7/6 net. Adlard and Son, Ltd., 21 Hart St., London, W.C.1, 1927.

This small volume, primarily for students of cellular biology, affords evidence of a great deal of work; the author states that observations were made on some ten thousand cultures. As a result of the observations the author draws some interesting deductions: for instance, that the marginal multiplication of a bacterial colony is vegetative and that papillary multiplication is of a primitive sexual kind. The debatable question—"Is variation due to external agencies alone, or to external agencies combined with conjugation?"—is discussed from the experimental viewpoint, and the argument that segregation and autogamy is consistent with the facts of bacterial variation is strongly advanced.

While many tables, the citation of experiments, and detailed descriptions of methods make the text difficult to follow, the book will be welcome as a contribution to the subject. FRED CADHAM

The Injection Treatment of Varicose Veins. A. H. Douthwaite, M.D., M.R.C.P., (Lond.) 39 pages. 3/- net. H. K. Lewis & Co., Ltd., London, 1927.

In this booklet the author explains the technique of the treatment of varicose veins by intravenous and perivenous injection of irritant drugs, (*e.g.*, quinine, sodium salicylate, biniodide of mercury, glucose, phenol and iodine).

The object of the procedure is to produce thrombo-sclerosis in the dilated veins. The injections are followed by a certain amount of pain, but there is no loss of working time by the patient. There are many difficulties and a few dangers associated with the method, but it is stated that embolism has never been a complication. Uniform success is claimed in this form of treatment, but there is no guarantee against return of the varices. Hemorrhoids may be successfully dealt with by this procedure.

The contra-indications include pregnancy, phlebitis in the deep veins, and heart failure. The injections may be inadvisable in the presence of hyperpiesis, nephritis, uterine fibromyomata, and during menstrual periods. R. R. FITZGERALD

Collected Papers of the Mayo Clinic and the Mayo Foundation. Edited by Mrs. M. H. Mellish, H. Burton Logie, M.D., and Charlotte E. Eigenmann, B.A. 1,329 pages, with illustrations. Price \$13.00. London and Philadelphia; W. B. Saunders Co., McAlinsh & Co., Toronto, Ont., 1927.

As in previous volumes of the "Collected Papers of the Mayo Clinic and the Mayo Foundation", the 1927 issue consists largely of material selected to meet the interests of the internist and the surgeon. Papers of special interest in more limited fields have been abridged, abstracted, or referred to by title only. Those interested in any one subject will find a good bibliography to supplement the published papers, which are, as a rule, short and concise. The majority of the contributions are, perhaps, intended to fulfil the function of bringing the reader up to date with a subject rather than to give him a detailed outline of it.

To single out any one contribution as worthy of

comment would be doing an injustice to others of equal merit. Nearly two hundred present or former members of the Clinic or Foundation have contributed, and noteworthy advances are recorded in medicine, surgery, physiology, pathology, metabolism, and technique. Among the latter we note papers on Further uses of lipiodol in roentgenology; A new dye for gall bladder visualization, and, the Relief of Renaud's disease by ganglionectomy.

The book is a revelation of the immense volume of experimental investigation which is being carried on at the Mayo Clinic. Pursued in many instances as a purely scientific research, knowledge gained has been correlated with clinical observation, and made to serve an immediate useful purpose. Medical and surgical problems have been studied by laboratory men; and physicians and surgeons have made use of the facts obtained, and published them for the general good. Such a combination can not but result in the advancement of medicine as a science. E. S. MILLS

The Surgical Clinics of North America. 799 pages, illustrated. Volume 7, Number 3, Chicago Number. London and Philadelphia, W. B. Saunders Co., McAlinsh & Co. Ltd., Toronto, 1927.

One has only to look at the list of contributions to be certain of the merits of the book.

The clinics cover a wide range of surgical subjects and are given in an easy and conversational style lacking only the personal touch of the real clinic.

The subject matter is well illustrated by clear drawings and x-ray prints.

Dr. Bevan's clinic on two cases of head injury is very instructive. Parotid tumours, always a difficult subject, is dealt with by Dr. McWhorter who emphasizes the lack of appreciation of the anatomical relations of the gland to the facial nerve. This relationship he gives in detail.

Carcinoma of the large bowel is ably treated by Dr. Carl B. Davis who emphasizes the advantages of a two stage operation.

Dr. Herbst's clinics on the ureter and bladder are admirably given. He reminds us that acquired strictures of the lower end of the ureter are secondary to infection lower down in the urinary tract and which must first be treated followed by repeated dilations.

Dr. U. J. O'Connor draws our attention to the necessity of doing a pyelography in the upright position as well as in the prone before subjecting a patient with traumatic dislocation of the kidney to operation. He describes a very efficient operation for elevating and fixing the kidney.

Dr. Ryerson confirms our own opinion that no one method is always successful in the treatment of ununited fractures.

The clinics, as a whole, are good and well maintain the high standard set by those of previous years.

GEO. F. SELDON

Synopsis of Surgery, Ernest W. Hey Groves, M.S., M.D., B.Sc. (Lond.), F.R.C.S. (Eng.) Eighth edition. 674 pages. John Wright & Sons, Ltd., Bristol, 1927.

The fact that Groves' Symposium of Surgery has now reached the eighth edition speaks well for the merit of the work. In the preface the author has given his aim and object in compiling this work, which could only be accomplished by a teacher of long experience. The whole field of surgery has been taken up in a clear, concise and dogmatic manner. The contents have been thoroughly revised and brought up to date with the latest developments of surgical science.

To the student and clinician alike it will prove of inestimable value, and to the busy surgeon a book for daily reference. GEO. E. SELDON

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1249

SECOND LISTERIAN ORATION

BY

SIR CHARLES SCOTT SHERRINGTON, O.M., G.B.E., M.D.,
D.Sc., LL.D., F.R.S., etc.

Waynflete Professor of Physiology, Oxford

*Delivered in the Convocation Hall, University of
Toronto, June 18, 1927*



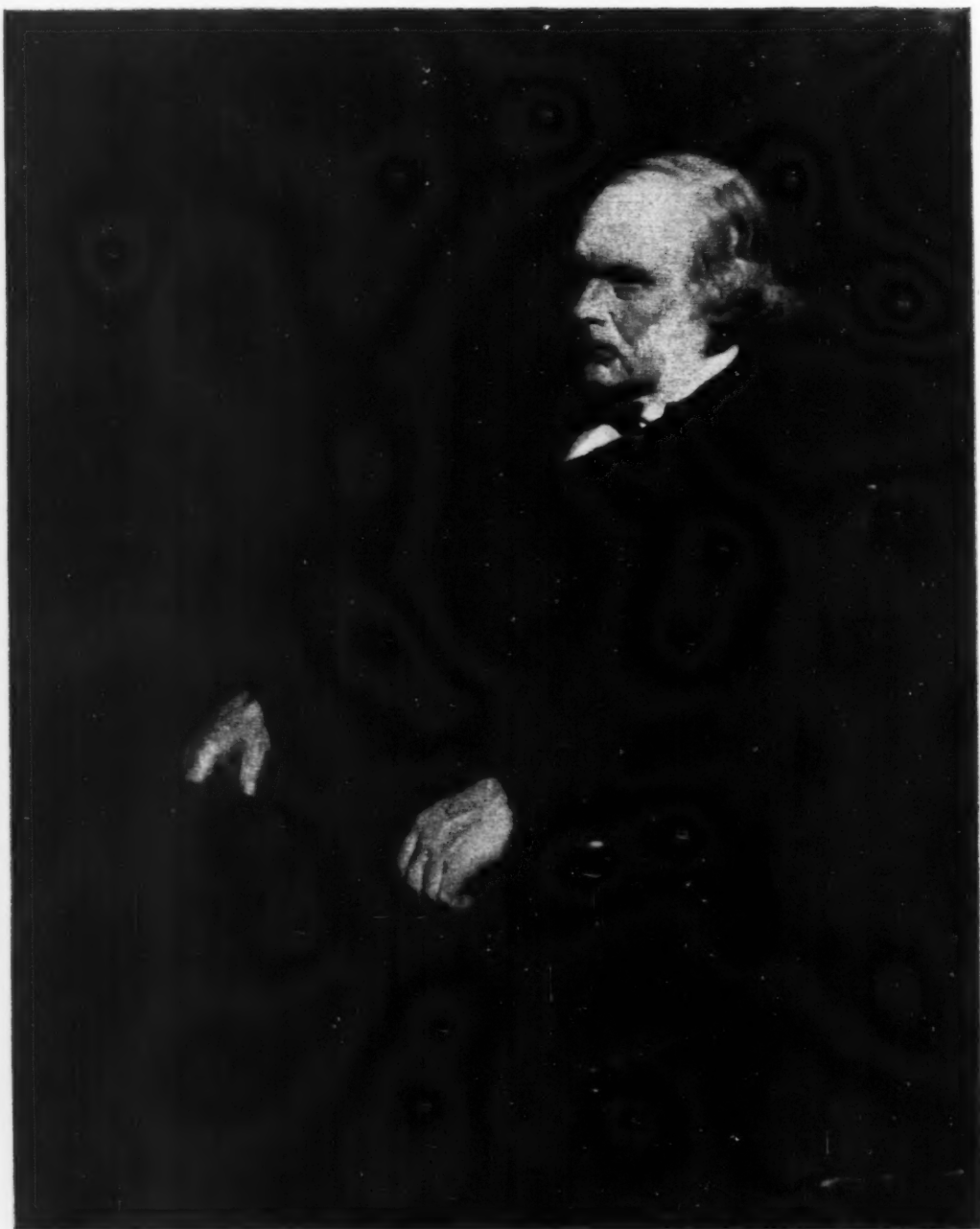
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LISTER

After a portrait by Mr. J. H. Lorimer, R.S.A.
(1895)

FOREWORD

HE Executive Committee of the Lister Memorial Club has again the pleasure of presenting the members of the Canadian Medical Association with a special number of the *Journal* containing the triennial oration of the society as delivered at the annual meeting of the Association in Toronto, June, 1927, by Sir Charles Scott Sherrington, O.M., G.B.E., D.Sc., LL.D., F.R.S., etc., Waynflete Professor of Physiology in Oxford.

The Committee in making arrangements for the oration recognized the important place which physiology occupied in Lister's early studies. His enquiring mind was stimulated and attracted during his student days by the lectures of Professor Sharpey, the father of English physiology, and after graduation, while working in the surgical wards under Professor Syme in Edinburgh, he carried out important researches in several physiological problems which were engaging much attention at the time; the most notable, perhaps, of which was his successful investigation of the cause of the coagulation of the blood. It was, therefore, a source of great pleasure to the members of the Committee when Sir Charles Sherrington, as Professor of Physiology in Oxford, promised to deliver the second oration.

The address fulfilled all expectations. The greatness of Lister's character was clearly and pleasingly depicted and the story of his long, patient, but for many years futile, investigations into the causes inducing suppuration in wounds was told. Not, however, until he obtained from a friend papers describing Pasteur's discovery of the microbic cause of fermentation did he make progress. The speaker emphasized the keen but cautious investigating spirit with which Lister applied the knowledge he had thus obtained to the solution of the great problem which had hitherto baffled him. Many more years of investigation were necessary before complete success was attained. Gangrene and suppuration, the despair of the operating surgeon, ceased to occur under his new methods, and the awful pain and mortality attending operations of all kinds were checked. Following the general establishment of antisepsis, and later on of asepsis, and the employment of anæsthesia, surgery during

the past fifty years has been able widely to extend its field, and in great measure to accomplish its many beneficent aims.

It is with much pleasure also that in this special year of the Lister centennial—a centennial which has been so generally celebrated by the profession in all countries—we have the honour of publishing, in association with our own Listerian oration, the very interesting address of Mr. Archibald Young, B.Sc., M.B., F.R.F.P.S., Regius Professor of Surgery in the University of Glasgow, which was delivered at the opening of the Lister Centenary Exhibition in the Wellcome Historical Medical Museum in London on April 7, 1927. In it we are presented with a picture of the Glasgow Royal Infirmary with its disheartening mortality due to septicæmia, apparently unpreventable in the years before Lister assumed the chair of surgery in the university, and we are shown the wonderful change effected by his antiseptic methods. These years 1860-1869, during which he had charge of the wards of the Royal Infirmary in Glasgow, must be regarded as the most fruitful period of Lister's life, for it was during these years that he fully elaborated his antiseptic methods of treating wounds, and was able to present them confidently to the profession. Pasteur's work on fermentation had been before the public for a few years. Semmelweiss and Lemaire before Lister made use of disinfectants, but it was Lister alone who developed the antiseptic methods of surgery which have proved such an inestimable boon to suffering mankind. Lister remarked in one of his addresses regarding the process of inflammation as studied by him in the frog's web, "No one before me has, I believe, told the tale just as it ought to be told." A similar statement may be made regarding the development of the method of antisepsis in surgery.

In addition to Mr. Archibald Young's address we add from the pen of Dr. George Herbert Rae Gibson, D.S.O., Registrar of the Royal College of Physicians of Edinburgh, a brief account of the celebration of the Lister Centenary by the members of the British Medical Association at the annual meeting this year in Edinburgh.

We are indebted also to Dr. H. C. Jamieson of Edmonton, for the abstract from the Transactions of the International Medical Congress held in Philadelphia in 1876, the year of the Centennial Exhibition in that city. At that Congress Lister was present as a guest and was chosen to preside over the Section of Surgery. His brief address on taking the chair and the remarks by two Canadians which followed the reading

of a paper on "Antiseptic Surgery" will we are sure be read with much interest at the present day.

An account of the centennial celebrations of Lister's birthday, held in his honour in every medical centre throughout the Dominion, has already appeared in the May issue of our *Journal*, and the leading part taken by Professor John Stewart of Halifax, in initiating these celebrations has been duly acknowledged.

The Executive Committee, desires also, on behalf of the members of the Lister Memorial Club, to express thanks to the University of Edinburgh for permission to bring out, in this special issue, a reproduction of Lorimer's painting of Lister, and to the British Medical Association for the loan of the necessary blocks. Thanks are also due to the President of the Murray Printing Company for his generous offer to donate and supervise the printing of the plate.

A. D. BLACKADER.

LISTERIAN ORATION*

1927

By

SIR CHARLES SCOTT SHERRINGTON, O.M., G.B.E., M.D.,
D.Sc., LL.D., F.R.S., etc.

Waynflete Professor of Physiology, Oxford.

IN ancient times, in that old land of Greece, which taught so much that is perpetually beautiful because perpetually meet and right, custom was with the athletes met together at Olympia, to keep among their celebrations that of the heroes of past victories. In like spirit this Association proceeds to its celebration of the name of Lister. And by the kindness of this Association there is assigned to me on this occasion the honour of speaking of him before you. I bring to the task, however, no qualification like that of my predecessor, your inaugural orator of three years ago, a chosen pupil of Lister and his friend through many years, Dr. Stewart of Halifax. He happily could found the tradition of this celebration on personal memories of Lister, and he has thus preserved a number of them by placing them in the safe keeping of this Association as part of the written record of its Listerian Orations. To-night we stand a hundred years removed from Lister's birth. A hundred years now gives its vista to our retrospect, and must have its element of pathos for many who knew him. This year, on the actual centenary of his birthday, April 5th, the Worshipful Company of Merchant Taylors of the City of London, of which Lister was a Freeman, gathered at the hospitable table in their 14th century hall, not ten miles from the house where Lister was born, to do honour to his memory at which many guests were assembled from far and wide. On this occasion the sentiments of "Greater Britain" were voiced by Canada's representative, Mr. Irving Cameron.

Fifteen years ago, a few weeks subsequent to Lister's death, the then President of the Academy of Medicine of Toronto, Dr. N. A. Powell, at a session devoted to Lister and his work, dedicated that session in these words: "To the man whose memory we honour, it was given to confer greater benefits on humanity than have fallen to the lot of any one man else since time began." Spoken when the sense of loss was keenly fresh, that stupendous statement, viewed from the further vantage point of a hundred years since Lister's life began, is still as literally true.

* Delivered at the annual meeting of the Canadian Medical Association, Toronto, June 18, 1927.

I cannot attempt in the brief time before us, to recite formally the great story of his work; much of it is familiar to those assembled here. We may, however, examine together some steps in its accomplishment.

LISTER STUDIES THE PROCESSES OF INFLAMMATION IN THE FROG'S WEB

Let us picture first a young man seated at his microscope on a September evening seventy-two years ago when, as he wrote home next day, he proceeded as he had long planned, to watch in the web of the frog's foot the transition from health to inflammation following a transient point of injury. The young man is in Edinburgh; English, but teaching and learning in Scotland. The frog is Scottish throughout, as it came from Duddingstone Loch, which one can see from the Queen's Drive. There have been frogs famous in history. Thus, the frog which revealed to Malpighi and his microscope in Bologna the tiny tubelets for the blood which Harvey, discovering the circulation of blood, had guessed at but was powerless to see. Malpighi wrote on that day to Borelli, *magnum certum opus oculis video*, for that frog enabled him to complete Harvey's discovery, the foundation of modern medicine. Then there was the frog whose muscle happening to hang by a copper hook to the iron rail round the house top at Bologna, twitched as the breeze swung it, now 142 years ago, and by doing so fired Galvani's and Mrs. Galvani's curiosity and so Volta's; whence the electric power-plant at Niagara to-day, and the lighting of this hall by electricity to-night.

Lister's frog, on which he began his first-hand experimental study of inflammation, is truly not less memorable. Not that Lister's frog revealed any dramatic discovery to him forthwith, although he rapidly learned from it many things which were new. The hand of Providence shapes the course of discovery in sundry ways. Lister tells that he had recourse to these observations because he felt that some stages of the process of inflammation had not been traced as they might be. We see in it, however, more than those words express. We see genius directing itself, not toward this or that particular point of skill or difficulty in a highly technical art, but setting itself down to face a fundamental and all-pervading process as the central problem and master-key to surgery as a whole. Thus, watching inflammation daily on the one hand under the microscope in his laboratory, and on the other in the hospital of that pre-Listerian era, Lister's penetrative spirit came to perceive that this elemental, all-important process of inflammation, lying at the root of surgery as it did and does, bore a twofold import and was even as Janus was, double-faced. One of its faces, smiling and beneficent, said, and said truly, "I am the means by which Nature in her wisdom deals with, and repairs, and heals an injury and a wound; I am the Angel of Healing on whom the surgeon can rely; I say to him, be of good cheer." But its other face, scowling and malignant, said,

"I exhaust with fever; I destroy tissue and life; I am the surgeon's evil fate; all his care and skill I bring to nought; I bid him despair."

The problem which thus shaped itself to Lister, pursuing with patient enthusiasm his impassioned study, was in a word the control of inflammation. Might it not be possible, he asked himself, to glean by careful observation and experiment such knowledge as might enable the surgeon to suppress the harm and retain the good; to cultivate inflammation, the healer, and to banish suppurative inflammation, septicæmic inflammation, and gangrenous inflammation, the destroyers. The task must at that time have appeared to most men insuperable, the hope fantastic. But Lister had courage to hope. The comment of older and experienced onlookers and colleagues would be in effect: "Yes, inflammation is both beneficial and harmful, both healer and destroyer; but inflammation and suppuration are one great natural process; how in that process sunder its good from its evil? Man can not part what Nature has conjoined. Humanity must bow before its inexorable fate of admixed good and evil."

Now Lister loved surgery; had a proud faith in surgery; no one could have felt more acutely than did he, living in those years, the bitter fact that as hospitals grew, the blight upon them from uncontrolled and malignant inflammation seemed to grow disproportionately with them. A surgeon adverting on those times has written: "Some hospitals on the continent of Europe were entirely closed, because hospital gangrene, blood-poisoning and death followed every operative intervention."

LISTER'S OPPORTUNITIES AND EQUIPMENT

What equipment had the young Lister for solving this dire problem, insoluble as it seemed? Bacteriology, he had not, for it was uncreated as yet, being a future child largely of his own work to come. Laboratory also he had not; for in the sense in which we today understand it there was no laboratory at that date attached to any surgical clinique. No, Lister's equipment for the problem consisted in a ceaseless contact with surgical cases for which his eye never staled, and an impassioned interest in surgery which never flagged. He had too his trusty microscope; and he had first-hand knowledge of the current physiology, and of some of the chemistry of his day. Such work as this he was wont to turn to constantly in that one room, back-parlour, workshop, sanctum, which ever we choose to call it, which he set apart, whatever house he dwelt in. Over and above anything with which technical training could equip him, Lister had his character in its bearing toward Nature and toward men. As an observer he had patient enthusiasm, modesty and intensity, self-restraint in inference, scrupulous probity of statement, and that undaunted scientific courage whose one fear is lest it should lose the truth. These were reinforced by a profound compassion for, and passionate sympathy with suffering, so that every fibre of him strained to work for its relief. That painstaking scientific nature of his, satisfied

with nothing unless tested by himself, harboured an optimistic scepticism, which declined to rest satisfied with the view that suppurative inflammation was inalienable from surgery. The account, which one of his early physiological papers gives of the pigment cells of the frog's skin watched through the microscope, remains a piece of masterly scientific description. From the detailed study of these pigment cells in his early years, Lister drew some of that vivid insight into cell-life struggling against irritant, agents which informed and directed his triumphant surgical strategy later on.

There was genius in his decision for a frontal attack on the universal and seemingly impregnable position of suppurative inflammation; the humility of genius, to set itself to begin at the very beginning; the daring of genius, to set itself to rebuild from the foundation. So also now, in his incorrigible optimism and persistence, surely we again see the inspiration of genius, to hope against all hope.

And so our glimpse of him and his task in 1855 must leave him to its prosecution, on the one hand in the surgical clinics; on the other in his lodging with his microscope and the web of the frog's foot. We recognize in him a man who is at once very modest and very determined, and we know that history has privily inscribed him on her scroll as the man destined to make surgery safe for the world.

TEN YEARS LATER—PASTEUR'S RESEARCHES

Our picture shifts to a decade later. In those ten years what progress has he made toward his great aim? To outward seeming, that is as regards a routine method, he has been travelling along the beaten track much the same lines as other surgeons of the time, but his spirit of enquiry, and his reflections on the great subject of his study, have brought to him certain conclusions. One is, in his own words, that "the essential cause of suppuration in wounds is decomposition brought about by the influence of the atmosphere upon blood or serum retained within them and, in the case of contused wounds, upon portions of tissue destroyed by the violence of the injury."

The influence of the atmosphere? Can then the gases that we breathe engender mischief in and thus poison wounds? No, said Lister. Air entering the pleura through a small tear in the lung does not of itself cause inflammation. Lister felt certain that the cause of suppuration could not be just the air itself. Yet the air brought it. What mysterious and evil endowment of air could it be?

FIRST ACQUAINTANCE WITH PASTEUR'S INVESTIGATIONS

Absorbed concentration on one problem was part and parcel of Lister's character. All that by seeing, hearing, or reading he came across in his strenuous, but constantly reflective day, could not but influence his thoughts on the problem which engrossed his thought. In this year

1865, to which we have now followed him, ten years since he sat down to study that frog in Edinburgh, his colleague at Glasgow, Thomas Anderson, the Professor of Chemistry, showed him some recent papers of a French chemist, by name Pasteur; papers dealing with the causes of fermentation and putrefaction which up till then had been thought to be due to spontaneous chemical decomposition. Putrefaction—why that was the very thing that he, Lister, told his students was the cause of suppuration. He must see what this chemist Pasteur had to say of putrefaction—perhaps nothing valuable; the subject had been always very obscure and complex. Nevertheless, he ought to read what this chemist had to say. And so, Lister the surgeon, open-minded and cautious, read the French chemist's papers and found the announcement that putrefaction was caused, not by air as such, but by reason of very minute living beings, germs, carried by the air, and settling in these fluids. This chemist even asserted that animal fluids have no natural tendency to putrefy, but ferment and putrefy only under the action of germs which the air may bring. Could this be true? The renowned chemist, Liebig, so Lister learned, refuted this view and had brushed it aside, oracularly and even scornfully. Nevertheless, the evidence of this young chemist, Pasteur, was given clearly and seemed well-grounded. Lister's open but cautious mind felt he must give this supposition a trial. Once more in Lister's make-up we meet genius. Chance, if we call it so, had put into his hands the account of a discovery made in another land, and in a different branch of science from his own; a discovery by a worker unknown to Lister, and indeed, unknown to medical circles generally even in his own country; a discovery discredited by Liebig the acclaimed leader of the medical chemistry of the time. Lister however was, open-minded, and his genius, the genius inspiring his own observations and reflections of the past ten years, had prepared him. In the field of observation and natural discovery, chance favours only him who is prepared. Putrefaction, air, and yet not the mere gases of the air; he himself had come to recognize that as the probable truth in regard to suppuration and sepsis. The more he studied Pasteur's experiments the less they seemed open to criticism, and the more he felt that wound suppuration and sepsis might indeed be due to contamination, and the growth in the wound of minute microscopical living beings carried by the air.

PERSONAL INVESTIGATION OF RELATION OF MICRO-ORGANISMS TO SUPPURATION

Lister's nature was not to draw an inference and leave it at that, a mere likelihood, a probability unproven, although also undisproven. Without delay in this year 1865 he set to work to test by clinical observation and laboratory experiment this new view and possibility. He applied wound-dressings excluding germs from, and calculated to destroy

germs which might be already in wounds he treated. Conviction grew in him as he proceeded. Then rose the great generalization to his mind, that the French chemist Pasteur in his brewery, and himself in the surgical ward were both envisaging and engaged upon separate aspects of one and the same fundamental problem; fermentation, putrefaction, wound infection and sepsis were all one. It is, perhaps, difficult for us now, in the light of all that has since become common scientific knowledge, to appreciate fully the intellectual flight exhibited by Lister in this generalization. It was a step of genius, if ever genius was. Lister's modesty and his unassuming, though ever dignified, address has perhaps stood in the way of a general attribution to him of genius. There clung to him throughout life something of that simplicity of manner and of phrase, which had been part of his upbringing in that wonderful and beloved home circle of his Quaker parents. Characteristic of Lister all his life was a sobriety of expression, which made yet the more impressive his self-restrained statements of the great results achieved as his new surgery developed. No man in his career had more excuse for, more justification for, hyperbole than had Lister, and no man ever indulged less in hyperbole than did he. Lister's rapid perception of the relation of Pasteur's fermentation work to the great problem of suppurative inflammation, which was confronting surgery, was genius. Such a relation to Pasteur's work was not foreseen by Pasteur himself, or by any of those working with Pasteur. It took Lister long to bring it home to, or even to make it understood by, many of the ablest surgeons of the time, in spite of the impressive testimony of the facts. Lister, alone of men, perceived because his mind was prepared by his own researches, and because like Pasteur he had genius.

LISTER'S APPRECIATION OF THE TRUTH

The problem, as Lister seized it may be stated thus: wound infection with all its attendant horrors and disasters was due to, and traced to, living particles entering from without and propagating on the wound surfaces, and in the wound discharges. The horrible and deadly chain of catastrophes, which had come to be regarded as practically unavoidable, could, therefore, henceforth be fought on a rational basis. Lister accordingly sought for some chemical agent, some "antiseptic" which would kill the germs. The problem, however, was not simple. A chemical agent which could kill germs was prone also, when applied to a wound, to harm the living cells of the wound on which repair depends. Moreover, the antiseptic which could kill the germs was liable to lose much of its power when applied to a wound which was freely discharging; the wound discharges reduced or even abolished the active power of the antiseptic; and the antiseptic itself, if applied in strong solution, caused harmful corrosion of the wound surface. Therefore another step in his campaign was to obtain asepsis by an antiseptis, not only to des-

troy germs which had already got into the wound, but to prevent microbes from entering the wound. This killing of germs in or upon dead material, sponges, ligatures, instruments and the like presented no such difficulty as that inherent in the methods for destroying germs actually within the wound. For wounds, therefore, which were to be deliberately inflicted, as by the surgeon in planned operations, Lister's resource was to destroy the microbes beforehand on everything which would come in contact with the wound; in short to preclude germs altogether from access to the wound. Under this plan he soon found that wounds healed regularly without suppuration, by "first intention;" infection practically disappeared, hospital gangrene, blood-poisoning, erysipelas and tetanus vanished from his wards. The cavities of the body, the abdomen, the chest, the great joints, which before were holy of holies which even the greatest surgeons, the high priests of surgery, did not dare to enter, could now be laid open with impunity by any faithful follower of Lister, and the diseases which affected them be made subject to their skill.

INFLUENCE OF ASEPSIS ON SURGICAL PRACTICE

In October 1867 he wrote to his father: "I now perform an operation with a totally different feeling from what I used to have; in fact, surgery is becoming a different thing altogether." Such simple words from him announced the ever-memorable conquest of surgery, the founding of a system of wound-treatment, which has relieved mankind from most of the danger and suffering attendant on wounds and surgical operations, and has permitted the art of surgery to advance to unimagined achievements. Diseases from which there was no release save by death could now be eradicated and life and health restored to the sufferer.

After convincing himself and his own immediate students, however, he had still to convince the world. That he had difficulty in so doing, we all know. It is difficult to get a hearing from busy men for even a great new truth. Some misunderstood even when they did hear. Some were experience-hardened, and not open to hear. Some were wedded to old ways, and hardly wanted to hear. Lister worked unceasingly at his task; his noble character was quite undismayed; he disliked controversy, and he taught his new principles by practical example in the wards even more than by precept in public addresses. He was wont to say that the first to practise his principles, outside of Great Britain, was Professor Saxtorph in Denmark. An anecdote is told by Saxtorph showing a difficulty of the reform. Saxtorph's clinic in Copenhagen was in those days served by nurses of the old school, worthy women, but unversed in the principles of antiseptis and asepsis. To save the time of the visiting surgeon their zeal took pride in having the patients' dressings all ready and opened for inspection. What was Saxtorph's dismay on his visit one day to see an amputation stump he had so care-

fully dressed all stripped of its antiseptic protections and bared to the surroundings of the ward. He exclaimed to the zealous nurse whose deed it was: "Is this imbecility or wickedness?" The good woman answered contritely, "Oh, please believe me, it is imbecility."

GRADUAL RECOGNITION OF THE IMPORTANCE OF ASEPSIS

Considering all things, the progress made by Lister's teaching was not slow. To effect so great a revolution in the theory and practice of a skilled professional art based on long tradition, twenty years is a brief period. Not many great practical reformers have at the age of sixty been able to look round and see the world convinced and eagerly adopting what at the age of forty they had first begun to introduce. Yet that was Lister's happy case. Public veneration and gratitude began to attach to his very name. He wore his years well. As we all know, the summer after his 70th birthday found him here in Canada, for the Toronto Meeting of the British Medical Association, active, alert, and despite his years youthful, especially in his keenness on new work and ideas. He often recalled this Canadian visit with especial delight. In 1898, he was made President of the Royal Society. In his valedictory Presidential Address to the Royal Society six years later he recounted with vivid animation a scientific incident which during his Toronto stay had profoundly impressed him: a demonstration by Dr. W. G. MacCallum, now Professor W. G. MacCallum of Johns Hopkins University. His words were: "The wonderful discovery by Dr. MacCallum, which, but for the beautiful demonstration of it I saw at Toronto, would have seemed almost incredible." It was a discovery of fundamental importance for the investigation of the then newly-revealed malaria parasite.

RE-EQUIPMENT OF SURGERY

Lister's late and declining years have as their background the glow, as it were, of the affectionate reverence of an innumerable host. The man in the street knew in a sort of way that Lister had banished fever and pain from the after-history of surgical operations; those with more detailed knowledge can trace to his research besides these special and transcendent benefactions to humanity, others no less benign.

By re-equipping surgery for fresh conquest and ampler scope, he gave to experimental medicine and physiology a new means and power for discovery. Surgery is a great weapon for research. The experiments discovering the localization of function in the brain could not have been carried out except by technique on the lines of Lister's then newly-discovered principles of surgery. Pavloff could not have made his discoveries revising our knowledge of the digestive organs without pursuing Lister's principles. Hardly five years ago the civilized world received from Toronto with grateful acclamation the beneficent discovery of insulin, which has since brought relief and rescue from death to thousands. I

am confident the distinguished and chivalrous investigators, alumni of this University, whose brilliant work achieved that immortal advance would be the first to tell you that in part, the means and the technique for the achievement was laid by Lister years ago, though he himself could never have foreseen the pillar of victory over disease and death which they were to erect with its shining light sending rays of hope and relief and comfort to diabetic sufferers the world over.

It is sometimes remarked with regret that Lister's writings seem to-day but little read, but the significance of Lister's work lay no more in the written page, than did that of Jenner or Pasteur. It lives, and its commemoration lives in daily recognition of it by the surgeon, and indeed by civilized communities over the whole planet. Thus it is that through years to come, although Lister's actual papers may become matter chiefly for the historian and the antiquarian, Lister will receive his unfailing meed of commemoration in the manner, which of all ritual and offering, would have been the most congenial to him, namely, the daily observance of the methods which he discovered and taught for the alleviation and prevention of disease. That is praise of a kind, which, testifying as it does, to the triumphant truth of his theory and practice, also establishes for it something which can be said, but rarely, of achievements of applied science however great. For year after year affirms and confirms that the step taken by Lister will never be retraced or withdrawn from as mistaken. Lister chose for his life's task the most urgent problem in all surgery and set out to work a theoretical, and founded on that, a practical solution, which was in principle complete and which nothing in principle can complete further. His work perpetuates him in the memory and gratitude of mankind, humanly speaking, for ever.

The Council of his own College of Surgeons solemnly declared of him at his death: "He raised surgery from a dangerous and precarious practice to a precise, safe and beneficent art." Those words by their very omission of all reference to time, bespeak truly the permanence of his achievement. Lister put a new and unimagined power into the hands of man for healing, for remedying injuries, for subduing pain, and for keeping death itself at bay. The astounding thing has been said of him, and can be said of him with every likelihood of truth, that though he inaugurated his work not seventy years ago, he has already been the means of saving more lives, than all the wars of the past 1,000 years have destroyed. A high authority has said that he has been the means of relieving more pain than all the drugs that are known. Lister it is who more than any other has made surgery what it is to-day, a far-flighted Angel of Mercy the civilized world over. It is with these things in mind and at heart to-night that our gratitude brings its offering of admiration and veneration to the memory of one great in character as in achievement, and great even among the greatest of the benefactors of mankind, Joseph Lister.

LISTER

AN ADDRESS DELIVERED ON THE OCCASION OF THE RECEPTION GIVEN
AT THE OPENING OF THE LISTER CENTENARY EXHIBITION
AT THE WELLCOME HISTORICAL MEDICAL MUSEUM,
LONDON. APRIL 7, 1927.

By

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IT is both an honour and a privilege to be permitted to take part in this historic function, by which we mark the Centenary of the birth of our great Master—Lister. Honour and privilege have fallen to me partly because of the accidental circumstance which associates me with the Regius Chair of Surgery in the University of Glasgow, which, from 1860 to 1869, was occupied by him whose birth we celebrate to-day; and partly by reason of the absence of Sir Hector Clare Cameron, whose deputy in effect I am. Sir Hector, to his profound regret, and to our sincere sorrow, felt himself unable to face, at his advanced age, the considerable strain of the journey to London.

The honour and the privilege which are mine to-night imply a particular obligation. The obligation is to the alumni and students of the University of Glasgow, in whose name I venture to submit my modest but sincere tribute of respect, of admiration, and of veneration. Beaconsfield has somewhere said "One of the greatest legacies of any nation is the memory of a great name, and the inheritance of a great example."¹ This is equally true when applied to a community, or to a school or seat of learning. The University of Glasgow has a long and glorious record, and its professorial roll includes the names of many famous sons; of many who have done notable work for the advancement of knowledge, and for the benefit of the human race. The traditions of well-nigh four hundred years cluster around the names of men who, in their day and generation, have done much to advance the efficiency and the repute of their Alma Mater. In the long and distinguished roll no name outshines that of Lister. What I have called elsewhere "The Lister Tradition"² renders illustrious for all time the Regius Chair of Surgery which he so gloriously and so fruitfully adorned. In the "Great Procession

of the Immortals" (spoken of by Sir Berkeley Moynihan in his John B. Murphy Oration),³ who, through the centuries, have promoted the well-being of humanity by their labours for the advancement of the science and the art of surgery, none will have a more prominent place.

As Antony said of Brutus "This was the noblest Roman of them all His life was gentle; and the elements so mixed in him that Nature might stand up and say to all the world "This was a man!" "⁴ Surely of the great Master we may truly say "This was a man."

THE DEVELOPMENT OF THE ANTISEPTIC SYSTEM

The story of the birth of the antiseptic system has been often told. During the last few days it has been told again, and from many and varied points of view. Through the ages it will continue to be told. What it has meant to humanity, in the relief of suffering, in the saving of life and limb, and in the bringing of a brighter hope in the battle with disease, most of us to-day are able to visualize only by the exercise of imagination. Few are alive to-day who know anything, save from hearsay, or from reading, of the terrible conditions which prevailed in the pre-Listerian days. Fortunately, many and authentic accounts are available, and the story of the dark days of surgery is there for all to read.

The history of the epoch-making investigations of Lister, and of his cautious application of the results of these investigations to the practical technique of surgical treatment, and of the unerring deduction with which he followed up the brilliant observations of his co-worker and friend, Pasteur, is generally known, and his position is generally acknowledged. It is true that others before him had had some inklings of the truth; like Semmelweiss, who, in 1847, traced puerperal fever to infection, and did much to indicate how it might be prevented, incurring much opposition and even obloquy thereby from those whose practice was to benefit most by his teaching; or, like L  maire, who, in 1863, in a treatise on carbolic acid, advocated its use for the destruction of germs in wounds; or, like Bottini, who, in 1866, urged that carbolic acid should be employed in the treatment of suppurating wounds, because he thought that certain germs were the active agents of suppuration. But it is none the less true that it was the master mind of Lister that finally solved the riddle of wound infection and its prevention; the apparently insoluble riddle, which had baffled for so long the most expert and enlightened surgeons up to his time. Lister was able to work out fully the whole problem; to show, beyond question, how infection should and could be excluded from a wound; how it should be counteracted did it gain entrance; and how Nature could be entrusted with repair, if noxious germs could be excluded from the tissues, or could be counteracted by suitable antiseptic agents. More than any man, Lister helped to free surgery and surgical development from the age-long bonds that shackled opportunity, and that limited progress in almost every direction.

The story, I have said, has often been told, both of the brilliant researches and of their practical applications. I have no intention of re-telling the oft-told tale. Is it not told in the very best of all ways in this great historical exhibition, collected and dedicated to the memory of the Master? The promoters of this Lister Museum have constructed here, in miniature, a picture of the great life work of the Master; a picture which, with judicious selection, yet with sufficient generosity of emphasis, portrays the successive steps by which was built up the complete doctrine of antiseptic surgery. Of it may truly be said, not merely that "every picture tells a story," but that "the whole picture tells the story." If then I do not propose to attempt to tell again the story of the birth of antiseptic surgery—which, expressed otherwise, meant the re-birth of surgery—I would like, nevertheless, to dwell for a moment on a few facts and figures bearing on surgical conditions in the times shortly preceding that re-birth.

STATISTICS OF PRE-LISTERIAN SURGERY

*From the 33rd. Annual Report of the Glasgow Royal Infirmary*⁵—that is, the Report for the year 1827, exactly a hundred years ago—I cull the following:—"The number of surgical cases was 795 average rate of death 14 1-6th. (males) and 14 1-5th (females). The operations performed amounted to 80, of which about one half may be reckoned capital, "or important." Note that the total death rate of the surgical cases was 7.08 per cent. The death rate, however, of the 80 cases operated on was 11, or 13.7 per cent. If, however, we accept the statement that only half of the 80 operations should be reckoned as capital, or important, the death rate is 11 out of 40; giving a percentage death rate of 27.5, or a little more than one death in every four cases operated upon.

Let us examine these figures a little further. Out of the eighty operations, or the forty capital operations, major cases, as we should now call them, twenty were amputations of thigh, of leg, of arm, or forearm, and at the shoulder. Of these twenty amputations, five died a mortality rate of twenty-five per cent. Two of the thigh amputations died of gangrene. Two of the leg amputations died; one from suppuration in the thigh, and the other with abscesses in the lungs. The cause of death in one of the arm cases is stated to have been sloughing of the stump.

Let us pass to the *35th Annual Report of the Glasgow Royal Infirmary*⁶—that is, the Report for the year 1829. I quote the following:—"The table of operations gives the results of each. They amount to eighty-one, and the deaths to eleven. Of the primary amputations, one died; of four secondary ones, three died; in all of whom purulent deposits were found in the lungs, and sero-purulent effusion into the cavity of the chest."

The question may here be asked. Why go quite so far back? What

about the times more closely related to the coming of Lister, and to the period of the re-birth of surgery? Very well. Let us take the year 1853, that is, twenty-four years later than the period referred to in the previous extract, and seven years before Lister's appointment to the Regius Chair in Glasgow.

From the *Quarterly Report of the State of Disease in the Glasgow Royal Infirmary*⁷—for the third quarter of the year 1853—I quote the following:—"The excessive mortality attendant on secondary amputations from injury is a result that should be well weighed by the surgeon in his attempts to save life and limb, for there are few points in practice better established than the great dangers accompanying delay in operation. By an analysis of 284 amputations performed in the Glasgow Royal Infirmary during a recent decennium we have been able to trace the following results, corroborating the experience of similar institutions." Here follows a very striking table, showing the results for the ten years' period referred to.

Nature of Amputation	Total	Forearm		Arm		Leg		Thigh		Mortality per cent.
	Cured or Died	C.	D.	C.	D.	C.	D.	C.	D.	
Primary	169	31	4	34	15	31	22	11	21	36.6
Secondary, from injury	56	3	—	7	9	6	13	3	15	66
Secondary, from disease	59	3	2	4	5	14	9	15	7	38.9
Total	284	37	6	45	29	51	44	29	43	42.95

The results shown in this table may be expressed otherwise:—

Amputations of forearm	6 deaths, of 43 cases.....	1 in 7
Amputations of arm	29 deaths, of 74 cases.....	2 in 5
Amputations of leg	44 deaths, of 95 cases.....	1 in 2.1
Amputations of thigh	43 deaths, of 72 cases.....	1 in 1.6

In other words, the *chances of recovery* were

6 to 1	in amputations of the forearm
3 to 2	in amputations of the arm
1 to 1	in amputations of the leg
.6 to 1	in amputations of the thigh (roughly 1 to 2)

Or, reversing these figures, the *chances of death* were:

For the forearm	1 to 6
For the arm	2 to 3
For the leg	equal
For the thigh	2 to 1 (roughly)

These are surely appalling and disheartening figures, which, as Sir Clifford Allbutt said, might well make "patients, no matter how critical their need, dread the very name of hospital, and the most skilful surgeons distrust their own craft."

PRE-LISTERIAN SCOURGES

Erysipelas, suppuration, pyæmia, hospital gangrene, these were the scourges that rendered the skill and the dexterity of the pre-Listerian

surgeons so often futile, and that so greatly depressed Lister himself. The new hope that he saw foreshadowed in the discoveries of Pasteur became, ere long, a settled conviction in his mind, and he set himself to apply the results of these discoveries, which his own investigations proved to be true, to the banishment from the hospital wards of these grim spectres of disease and death. Those of us who have not known the terror of these pre-Listerian days cannot properly realise how depressing, how disheartening, it must have been to the expert surgeon of those days to see case after case succumb to one or other of these mortal diseases. To-day, as complications of ordinary wounds, we know them not; even as occasional happenings, in cases grossly infected quite independently of surgical procedures, they are rare events. Hospital gangrene, in any of its forms, I suppose no surgeon of this generation has ever seen. But what a scourge it used to be! It was the bane of surgeons and of hospital managers alike.

PRE-LISTERIAN ATTEMPTS TO CHECK HOSPITAL GANGRENE

Turn again to the *Quarterly Report of the State of Disease in the Glasgow Royal Infirmary*⁸—for the first quarter of the year 1853—and read the following:—"We regret to learn, notwithstanding, that hospital gangrene has reappeared in several of the wards, and has been productive of much mischief. It scarcely admits of doubt, that this plague spot has arisen from the accumulation in any one department of too large a number of open sores; and its frequent recurrence furnishes another strong proof of the necessity which exists for additional surgical accommodation."

That the problem seriously exercised the minds of the Managers of the Royal Infirmary is seen by perusal of the next *Quarterly Report*⁹, where there is the following further reference:—"In our last report we had occasion to allude to the presence of hospital gangrene in some of the surgical wards, and to notice its pernicious effects on the recoveries of the patients. We are now luckily in a position to be able to record the entire cessation of the epidemic, not, however, without producing one fatal result." The *Report* goes on to describe the steps taken by the Managers to deal with the said epidemic, and the opinion is expressed that these steps, namely, segregation of the infected, and after-fumigation of the wards "are the only feasible measures that can be adopted with any degree of success in attempting to uproot the evil for a season." (the italics are mine, A.Y.) There was evidently no great hope in the minds of the Managers that the dread malady would not soon recur; and, doubtless, sad experience fully justified their lack of confidence. But the Managers go on to say, in the *Report*:—"On the other hand, for the purposes of prevention, we know no plan more effective than that of keeping the wards well aired, by having the windows constantly drawn, and retaining seasonable fires both in winter and summer. The advan-

tages attending this very free system of ventilation will be partially counteracted by the inflammatory complications which occasionally ensue from its adoption, but the occurrence of a few pleuritic stitches, readily succumbing to treatment, can never be put in comparison with the dire effects so liable to ensue from a single case of hospital gangrene." Yet in the *Report*¹⁰—for the fourth quarter of the same year—we find once again the admission that "appearances of hospital gangrene have occurred, but were speedily checked."

This view of the Managers of the Royal Infirmary that by improved ventilation and such means the dire hospital diseases, which we now know to be due to infection by pyogenic germs, could be effectively banished, was not easily eradicated. Indeed, it outlasted even the period of Lister's connection with the Infirmary, for we find it alluded to in a somewhat wrathful letter of the Secretary to the Infirmary, published, in both lay and medical Press, almost twenty years after the date of the last quoted *Quarterly Report*. The circumstances were these. When Lister left Glasgow for Edinburgh, on his appointment to the Edinburgh Chair, Lister published a paper dealing with *The Effects of the Antiseptic System of Treatment upon the Salubrity of a Surgical Hospital*.¹¹ In this paper he declared, that the adoption of antiseptic treatment had transformed the wards which had been under his care in the Glasgow Royal Infirmary from among the most unhealthy in the country into "models of healthiness." Voicing the opinions of the Managers of the Infirmary, the irate secretary proclaimed that the improved healthiness of the wards "as marked in the medical as in the surgical department," was to be ascribed mainly to "better ventilation, improved dietary, and the excellent nursing to which the Directors have given so much attention of late years".

SUCCESS ATTENDS EMPLOYMENT OF ANTISEPSIS

Lister had been able, indeed, to state in a paper delivered before the British Medical Association in Dublin, in 1867,¹² that: "during the previous nine months, in which the antiseptic system has been fairly in operation in my wards, not a single case of pyæmia, erysipelas, or hospital gangrene has occurred in them." Yet the truth took long to sink into the minds of his contemporaries, for, even ten years later we find the writer of a paper, read before the Royal Medical Society of Edinburgh, quoting from the Hospital Report the fact that though Lister had had only two cases of pyæmia in the previous eight years, in another service in the same hospital, there had been, within five years, no less than forty-three cases of that fell disease.

But why elaborate the story further? Why dwell at greater length on the desperate efforts of the ignorant, or the prejudiced, to prevent or to lessen the dread diseases of infection? Not all the opening of ward windows, not all the segregation of the infected, not all the fumigation

of the wards, could effectually safeguard any surgical patient from the risk of catastrophe. It remained to Lister to close the door through which the infective agents had been accustomed to enter the chamber consecrated to the active processes of repair.

There was admitted to the Glasgow Royal Infirmary, on the 12th. of August, 1865, a boy of eleven years, by name James Greenlees. He had sustained a compound fracture of the left leg. Lister put to the test the principles of his new system. In other words, he treated the case antiseptically, and with complete success. Dr. John Stewart, of Halifax, suggests, and not without good reason, that this date is well worthy of being marked specially in "the Surgeon's Calendar."¹³ As Dr. Stewart says,—“The Renaissance of Surgery had begun”. And what a Renaissance it was! What a Re-Birth! Less than two decades before, the discoveries of Humphrey Davy, Horace Wells, Morton, and Simpson, regarding the practicability as general anæsthetic agents of nitrous oxide gas, ether, and chloroform, had opened up a wide gateway to surgical advance, but that advance was effectually barred by the dragon of pyogenic infection. Lister's great achievement broke down the barrier, and the flood tide of advancing surgical triumph swept uninterruptedly on. The results of the great onward sweep are written in the abounding surgical literature of the last fifty years—what Ballance has termed “the most glorious period of British Surgery”.

The contrast between pre-Listerian conditions and results and those of recent days may be illustrated by a few further figures. I have alluded already to the striking figures of that disastrous decennium, prior to 1853, in which, in the Glasgow Royal Infirmary, out of 284 major amputations—forearm, arm, leg, thigh—122 died,—a mortality rate of 42.95 per cent. Let me pass right away to our own times, and give you the corresponding figures for the same Infirmary, half a century later—i.e. for the ten years' period ending with 1925.

The mortality rate of amputations of forearm, arm, leg, and thigh in the Glasgow Royal Infirmary, decennium 1916–1925 was as follows:—

Upper limb 122 amputations with 12 deaths..... 9.8 per cent.

Lower limb 467 amputations with 111 deaths..... 23.7 per cent.

Or, combining the figures for upper and lower limbs:—

There was a total of 589 amputations with 123 deaths; 20.8 per cent.

For comparison, I take the corresponding figures for the Glasgow Western Infirmary during the same decennium, there was a total of 300 amputations with 51 deaths; 17 per cent.

Allowing for variations, due to differences in type of industrial accidents, these figures may be regarded as practically identical; the death rate being therefore a little above or a little below 20 per cent, as compared with the death rate for the decennium fifty years before, of almost 43 per cent. It is even more instructive to compare the figures for amputations of the thigh in the two decennial periods in the Royal Infirmary. In the earlier period, there were forty-three deaths out of

seventy-two cases of amputation of the thigh; in the more recent period, only one death is recorded out of thirty-six cases.*

Taking the larger figures, however, by themselves, the fact is established that the mortality rate in cases of major amputations, in the same Infirmary, had been reduced from 43 per cent to 20 per cent in the space of half a century. The contrast is striking enough even as it stands, but the great drop in the mortality rate, stated thus baldly, is not even the end of the story. The figures become more striking when one has regard to two further considerations.

ANTISEPSIS OFTEN REMOVES NECESSITY FOR AMPUTATION

The first of these considerations depends on the fact that, in the pre-Listerian days, amputation was performed almost as a matter of course in any case of grave, or even substantial injury to a limb, and particularly in compound fractures. The chief point of controversy, in those days, appears to have been regarding the stage at which amputation should be carried out, whether early or late. It seems to have been an accepted doctrine that any attempt to save a limb which was at all seriously damaged implied too great a hazard. Suppuration, gangrene, erysipelas, pyæmia, secondary hæmorrhage, tetanus; one or several of these were likely to develop, and with the usual disastrous sequel. Today, amputations instead of forming the great bulk of surgical practice in any of the large general hospitals, as they did in the old days, have come to be almost a rarity, especially in industrial accidents, or in injuries incident to the social conditions of the times. Such cases as now come to amputation are either due to disease, or to those accidental injuries in which the damage to the tissues is so extensive and severe that not merely is the vitality of the limb practically destroyed, but the life of the patient is seriously imperilled. The mortality rate, therefore, of 20 per cent, of the recent period represents an immeasurably better state of things than the simple figures suggest. The rate is calculated on the basis of a group of cases, which include only those of the worst, most severe, and least promising type. To get a proper conception, indeed, of the real advance that the half century has brought about, it would be necessary to take into consideration also the vast number of limbs saved, in which, in the earlier period, amputation would most certainly have been carried out. Amputation has come to be regarded, to-day, as a last resort, almost as a confession of surgical defeat or failure. Thanks to Lister the great surgical ideal of to-day is not the successful amputation of a damaged limb, but its conservation. That great ideal of conservative surgery owes more to Lister, and to the Listerian doctrine, than to any one or to any thing else.

* Probably some allowance should be made here for a certain number of amputations of the thigh which may have been included in error in the list of amputations of the leg.

ANTISEPSIS PERMITS A GREAT EXTENSION OF THE FIELD OF SURGERY

The second consideration depends on the enormously widened field opened out by the success of antiseptic doctrine and practice. With the terrors of surgical infection banished, surgery has been extended with safety into domains that previously were effectually shut off from exploitation by even the most expert and the most daring surgical pioneer, and the operator of to-day is able to ply his art on a scale that would have appeared, and indeed would have been, hazardous in the extreme under the old conditions. Reference has been made earlier in this address to the record of eighty operations, quoted from the *Annual Report of the Royal Infirmary*, for the year 1827. Of these eighty, twenty were amputations. I take, for the purpose of comparison, the *Annual Report* of the same Infirmary for the year 1925, practically a century later, from which it appears that the operations for the year 1925 numbered 10,853, and of these only sixty-two were amputations. In other words, within the space of a hundred years, the annual operation total had been multiplied 135 times, while the number of amputations had been merely trebled. This expresses very well both the stupendous expansion of the domain of operative surgery, and the great development of the conservative ideal.

It has been said that, "statistics can be made to prove anything," and it may be admitted that there is a germ of truth in the generalization. But, if figures are carefully chosen, and employed with honesty of purpose, they are not necessarily the unreliable things that such a statement seems to imply. They may have a real value. I am well content to leave the figures I have quoted to tell their own tale, and to be interpreted according to the conviction of any honest enquirer.

GLASGOW ROYAL INFIRMARY THE FIRST HOSPITAL IN WHICH THE
VALUE OF ANTISEPSIS WAS PROVED

Glasgow is proud to think that the great re-birth of surgery took place within the walls of its oldest hospital, and the University of Glasgow cherishes the memory of her great Regius Professor of Surgery, and this in spite of the suggestion that has been made frequently enough, especially within recent years, that Glasgow has not had due regard to the memory of the Master. It is true that, in the earlier years after Lister began to promulgate his new theories, and to put them to practical test, he met with apathy, and even hostility, in Glasgow, as well as in Edinburgh, and in London. I believe, however, that it could be successfully maintained that the opposition which he encountered in these earlier years was less formidable in Glasgow than elsewhere. But, after all, controversy on such a question leads one nowhere, and serves no good end.

DEVELOPMENT OF OPPOSITION TO LISTER'S METHODS

It is, indeed, a fact that the promulgator of any new doctrine is generally received coldly. The revolutionary is always suspect. He is liable to be misjudged, maligned, opposed, and even at times painfully misrepresented. His teaching is generally called in question, and even held up to derision. Often enough his purposes, and his motives, are subjected to insinuation, or to innuendo, by the exponents and defenders of the older school of teaching, whose dominance seems to be challenged by the new teaching. It is ever the same. Old ideas die hard. Old doctrines are not easily assailed, and are with difficulty overturned. The traditional fate of the revolutionary is a hard one.

This traditional fate Lister did not escape. From the lot of the revolutionary he was not spared. In the art and practice of surgery, and in the teaching of its principles, Lister was a great revolutionary. He was bound to meet with opposition, and he did. He was apt to be misrepresented, and he most certainly was; indeed, the misrepresentation was often unscrupulous, and it came, frequently, from those who stood to benefit most from the great boon he had to offer. This same fate had been the lot of Semmelweis in his efforts to banish the scourge of puerperal fever from the practice of obstetrics. It would have been strange, indeed, had Lister escaped the common fate.

It may seem to us, who live in the light that has flowed from his work and teaching, almost impossible to understand how Lister's opponents, with the abounding evidence before them of the success of the new system, could have denied to him, for so long, the verdict that experience has now so fully accorded. It has been said by someone that "Lister's opponents asked for statistics," but that "Lister was too busy studying and experimenting to trouble with statistics." Yet, the statistics were there to their hand. It all depended on how they were to be applied, how they were to be interpreted.

Lister, however, was not dismayed, though he might be grieved by the opposition which he encountered. The older surgeons might spurn his doctrine, and minimize or misconstrue his results. They might speak scornfully of his investigations, and of the application of these to surgical practice. He was confident of the soundness of his conclusions, and of the correctness of his deductions. One cannot read the story of his researches, of their regular, ordered, systematized sequence; of how he made one step after another, making sure of each foothold ere ever he stepped a little higher and a little onward, without feeling that there never took place a more carefully controlled, a more truly scientific sequence of progressive investigation and research in the whole history of medicine or surgery.

And Lister was always his own most severe critic. A piece of reasoning, if it had successfully passed the bar of his own scrupulous and searching criticism, was hardly open any longer to effective attack.

As I have said, on another occasion, of his disciple, MacEwen,¹⁴ so would I say of Lister in this connection "His research was thorough, his observations were thorough, and his deductions were not hurriedly made. Nothing was to him a fact till he had himself observed and proved it. One may say that, having dealt with every side of the subject, and applied all possible tests, he was able to come to a conclusion which was to him final." Not till he had done this did he feel justified in the general promulgation of any part of his doctrine; but once he had done so, it was to him unassailable. Time has told already how well grounded was the whole doctrine, and we know to-day to what an extent it has brought relief from suffering, saved life, and promoted the happiness and the health of the human race.

LISTER HAD THE ENTHUSIASTIC SUPPORT OF ASSISTANTS,
DRESSERS AND STUDENTS

Though Lister met with much opposition in Glasgow, in Edinburgh, and even more markedly in London, after his appointment to the Professorship at King's College; and though he encountered, in all three places, the chilling effects of apathy and indifference, yet, in the two former places, at least, he was supported with almost unanimous enthusiasm by large classes of students, and he was served by loyal dressers and assistants. His experience in this respect is just what might be expected. It is historically true to say that revolutionary doctrine receives generally its chief support from the younger men; from those who are not bound by tradition or by dogma, as are the older. And it is worthy of mention that, though Glasgow has been blamed sometimes for failing in regard for the memory of the Master, yet it was in Glasgow that, from the very first, Lister found some of his most loyal supporters. Sir Hector Cameron, "the beloved disciple," who believed in Lister and in his message with his whole heart, and throughout his active life proved his loyalty by the constant exposition and advocacy of the Listerian doctrine, is still with us. The late Sir William MacEwen, a student of Lister also took a large part in commending to his fellows the teachings of the Master, and gave a large place, in his lectures, to the exposition of the Listerian doctrine of wound infection and its prevention. MacEwen was one of the doughtiest fighters in the Listerian ranks.

Last year, in my oration on MacEwen,¹⁵ I took occasion to point out how great a part MacEwen took in commending to his fellows the precepts of Lister. MacEwen was a tower of strength to the cause. All through his life he preserved his admiration, and indeed his reverence, for Lister. No doubt MacEwen travelled farther than the Master. "At an earlier period, probably, than any other surgeon in this country, perhaps even in any country, he passed on to the development of what seemed to him the natural outcome of Lister's doctrine, namely, the ideal of asepsis, and of aseptic surgery." In the same oration, I told

how the late Sir William T. Gairdner, on one occasion, characterized the position of MacEwen and those who followed him, by using a parody of a well-known phrase and altering it thus: *Ipsa Listero Listeriores*. Like Lister, MacEwen had to meet much opposition in his efforts to develop further the teaching of Lister. Even I am old enough to remember how MacEwen and his staff were held up to a good deal of ridicule in their earlier endeavours to develop their aseptic technique. Time, however, broke down prejudice, and everyone fell gradually into line with the inevitable advance.

Yes, Lister was well served by those who were his students, or his assistants. Throughout his life he frequently acknowledged this, and to none did he feel himself more beholden than to his students. On more than one occasion he made public reference to the debt he owed them. There is the occasion, mentioned by Godlee in his "Life,"¹⁶ when Lister, in 1902, having just been awarded the Copley Medal of the Royal Society, concluded his speech of thanks by saying that "he had often thought, that, if he did deserve any credit, it was at the time when, perfectly convinced of the truth of his principle on which he acted, and persuaded also of the enormous importance to mankind of being able to carry out that principle in practice, he worked for years together with exceedingly little encouragement from his professional brethren. There were, however, two great exceptions: his father-in-law, and his students."

STUDENTS UNANIMOUSLY SUPPORT HIS APPOINTMENT AS SURGEON
TO THE INFIRMARY

The students of Glasgow to-day recall, with particular satisfaction, a somewhat striking incident, in which their predecessors of over sixty years ago took part. It illustrates well the closeness of the bond of sympathy which, from the first existed between Lister and his students, and it also serves to show how, with the almost prophetic vision of youth, Lister's earliest students foresaw the great future before his teaching, and its importance in the promotion of surgical advance.

When Lister came to Glasgow, on appointment to the Regius Chair of Surgery, in 1860, he found himself without any direct hospital connection. There was not then, as there is now, any obligation on the part of the hospital managers to provide the Regius Professor with the clinical material and facilities for his teaching and to assign him wards in the infirmary, where he might at the same time practise his art, and illustrate its principles clinically. No right of appointment to the charge of wards was then implied in the terms of his selection by the Crown for the Professorship in the University. Did he wish, as he was surely bound to do, to obtain these facilities, it was incumbent on him to await the occurrence of a casual vacancy on the staff of the Infirmary, and even then, to take his chance of election in competition with such other applic-

ants as might offer themselves. His chances of election to such fortuitous vacancy were no better—perhaps, in virtue of adverse local influences, rather worse—than those of any other candidate. In fact, Lister was unsuccessful at his first attempt, in 1860, the year of his arrival in Glasgow. The following year, however, another vacancy occurred, and fortune was this time with him. He was appointed to the charge of wards in the Royal Infirmary in the latter part of the year 1861. The way was now clear for the carrying out of the great work, which was to make the Lister wards, the Royal Infirmary, and the Regius Chair of Surgery in the University of Glasgow, world-famous.

This explanation is necessary to a due appreciation of the incident which Glasgow students remember with much satisfaction and interest. Lister, in his first session after appointment to the Chair, lectured to a class of 182 students, and, at the close of the session, the members of the class took the altogether unusual course of presenting him with an address, expressing their appreciation of the lectures he had delivered to them, and the very high estimate they had formed of him as a teacher of surgery. But they did not stop with this general expression of their appreciation. There was a prospective vacancy on the staff of the Royal Infirmary, and Lister was a candidate for the appointment. The students, therefore, proceeded to express their hope that, "for the sake both of the rising profession, and of the Institution itself," his application would be successful. In other words, the address was meant to be what we would regard, today, as a testimonial in support of his application. It was signed by 161 members of his class.

The incident seems to have been of so unusual a character as to justify this special reference. It was what one may call a reversal of the usual. The teacher of to-day is accustomed to give testimonials to such of his students as may seem to merit them, to further their career, and to support their claims to such appointments as their abilities warrant, and the stage of their professional development may justify. Here we have the very opposite, the reversed process; the students giving testimony to their loved teacher, in whose ability and future they saw, with confidence, great things.

The address is worthy of being quoted in full:—

"Joseph Lister, Esquire, F.R.S.,

Professor of Surgery in the University of Glasgow.

Sir,

We the undersigned students of Surgery in the University of Glasgow cannot allow this, the first, session of your Professorship to close without thus formally expressing our high opinion of the lectures which you have delivered, and recording our testimony to your eminent ability as a teacher of Surgery.

Permit us also to express our hope, for the sake both of the rising Profession, and of the Institution itself, that in the approaching appointment of a Surgeon to the Royal Infirmary, your application may meet with that success which your ability and position demand."

The address is still preserved. It forms one of the exhibits—I venture to think, one of the most interesting—in this great collection.

The signatures of almost all who subscribed it to are capable still of being recognized without much difficulty, in spite of the inevitable ravages of dust and age. I came upon it, some months ago, by accident, in the course of a somewhat casual survey of some of the exhibits, and my interest was stimulated by the accidental discovery amongst the signatures of an uncle of my wife, and of an uncle of my own. I had not previously realised that they had been members of Lister's first class in Glasgow, though I knew that they had been his students. Both are now dead, but their signatures are there, clearly recognizable—"William Loch Stuart," and "John Young"—and I like to think that, through them, I have a link with our great Master other than that of my official bond of union as the humble occupant, for the time, of the Chair which he adorned. I have been able since to trace and to obtain the class tickets and the diplomas of both. These have the signature of Joseph Lister. They are cherished possessions.

I am glad to think that the original document of the address, the property of the Glasgow Lister Memorial Committee, with its almost prophetic foreshadowing of the great future for Lister and his work, will come to rest finally where it was presented so long ago.

LISTER'S APPRECIATION OF HIS STUDENTS' SUPPORT

It is certain that Lister never forgot the support and appreciation of his students, in Glasgow and in Edinburgh, and one of the later of his public addresses was that which he delivered before the Glasgow University Medico-Chirurgical Society, in May, 1894. The engagement was a long promised one, and one not to be soon forgotten by any of those who were privileged to be present. The Hall of the Students' Union was crowded, as well it might be. There was a great assembly of students; members of the Society, and many former assistants and house surgeons, and a few old colleagues. Lister's theme had reference to the great subject, the working out of which had constituted the main object of his active surgical life. He dealt mainly with the simplification of antiseptic technique. The address was received with great interest and enthusiasm, but it was probably the presence of the Master, more than the subject matter, or the manner of delivery of the address which marked the meeting, in the minds of those who were privileged to be there, as a memorable event. MacEwen, who was called upon to speak, after Lister had finished, indicated his sense of this dominant feature of the meeting by uttering a single sentence, and at once resuming his seat. The sentence was this:—"When the nightingale sings, all the other birds are silent, lest their feeble notes disturb its song."

This was the only occasion on which I saw Lister, and the occasion was made especially memorable to me by the fact that, being an official of the Society, I had the very great honour of shaking hands with him.

I have finished what I set out to do, namely, to offer, on my own

behalf, and on behalf of the great School of Surgery where Lister's life-work was begun and in great measure brought to fruition, a tribute of admiration, respect, and of veneration to his great memory.

Glasgow has not forgotten Lister, nor will the University of Glasgow soon forget her great Regius Professor. It is surely a great thing for the alumni of Glasgow to be able to feel that, through the work of Lister, it may be said truly of the surgeon of to-day, all the world over "His lines are fallen unto him in pleasant places; yea, he has a goodly heritage."¹⁷

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THE CENTENNIAL CELEBRATION OF LISTER'S BIRTH

By

THE BRITISH MEDICAL ASSOCIATION AT ITS ANNUAL
MEETING, EDINBURGH, JULY 20, 1927

Reported by Dr. George Herbert Rae Gibson, D.S.O.

CO celebrate the Centenary of the birth of this the greatest of all surgeons a distinguished company was gathered together in the McEwan Hall, Edinburgh, on the evening of Wednesday July 20, 1927. The Earl of Balfour, Chancellor of the University, presided, and was supported by Lord Provost Stevenson, Sir Alfred Ewing, Principal of the University; Sir Robert Philip, President of the British Medical Association, Sheriff Crole, Dr. G. M. Robertson, President of the Royal College of Physicians, and Dr. Logan Turner, President of the Royal College of Surgeons. Among the platform party were many old students of the time of Lister: Sir George Beatson, Sir George Berry, Sir Montague Cotterill, Dr. C. W. Macgillivray, Dr. T. M. Ronaldson, Sir William Watson Cheyne, Professor Tuffier of Paris, Professor Harvey Cushing of Boston, Professor John Stewart of Halifax, as well as Professor Wilkie and Professor John Fraser the present professors of surgery and clinical surgery. Among overseas representatives were Professor H. S. Birkett, C.M.G., Montreal, and Dr. John Fotheringham, C.M.G., Toronto. Those who that afternoon had received the honorary degree of Doctor of Laws of Edinburgh University were also present, and included the following: Vittorio Ascoli (Rome); Professor Charles L. Dana, (New York); the Right Hon. Lord Dawson of Penn, Professor Knud Faber, (Copenhagen), Professor Jan van der Hoeve, (Leyden), Professor Otto Meyerhof, (Berlin), Sir Berkeley Moynihan, Sir John Herbert Parsons, Sir Humphry Rolleston, Professor George Frederic Still, Professor Thayer, (Baltimore), Sir Almroth Wright.

The Earl of Balfour in paying his tribute to the memory of Lord Lister, linked his name with those of Pasteur and Simpson. He referred to the fact that surgery without aseptic treatment was too often the harbinger of death rather than the cause of health and recovery. Lister had made possible those operations that the discovery of the anæsthetic properties of chloroform had made feasible, but which the conditions in the hospitals had up to Lister's day rendered so disastrous. He spoke of the old days, the terrible page in the history of medicine, where, to

read what went on made one's blood almost run cold. It was a situation horrible to the surgeons, horrible though fortunately not always known to the patients, and it made one feel that of all the benefactors of sick and suffering mankind, the greatest benefactor was Lister himself.

Sir William Watson Cheyne spoke of these pre-Listerian days, when it had been far from a pleasure to go into a surgical ward. Most of the patients were suffering pain, many were delirious. To-day, patients are happy and contented, with seldom any complaint of suffering. Operations which would never have been performed in former days on account of the danger to life were now everyday occurrences. This had been brought about by the work of two men—Lister and Pasteur. Lister's influence on the students was very great indeed. It was of interest to record the fact that at the end of the first year's work in Glasgow his class sent him a letter of thanks for his interesting lectures and hoped that he would soon be appointed to the staff of the Infirmary.

Professor Tuffier of Paris recalled the scene of the meeting of Lister and Pasteur in the huge amphitheatre of the Sorbonne at the celebration of Pasteur's jubilee in Paris. An immense gathering was present composed of the leaders of science, who had come from all quarters of the globe. Never before had there been such a wonderful concourse of eminent men in that great amphitheatre. During the Great War the clinical and biological discoveries of Carrell and Dakin, true disciples of Listerian principles, brought about by their improved methods the disinfection of wounds, thus lowering mortality and saving thousands of lives.

Professor Harvey Cushing compared Lister and Lincoln. A short time ago, on a May morning he had been standing at the Lincoln Memorial in Washington, and as he read again the phrases of the speech at Gettysburg, it occurred to him that the words might be applied to the work of Lister. It was idle to speculate whether opportunity more often made the man—as was perhaps true of Lincoln—or the man his opportunity as was apparently the case with Lister. The really important thing was that the conjunction should take place. The opportunity to do something of lasting benefit to one's fellow men doubtless lay before all of us, yet even if we had the imagination to realize it, we lacked the courage to grapple with it, the tenacity to hold it, the perseverance and unselfishness to secure converts and disciples.

The last speaker was Professor John Stewart who had come far to pay his tribute to the memory of his old chief and teacher. He struck a simple, human and personal note, which carried conviction to his hearers. Simplicity was the keynote of Lister's life and teaching. He was simple in his faith, simple in his methods and simple in his thoughts and desires, but intensely earnest in his work. He had a love for music, a love for Scottish song, a love for children and a keen sense of humour. Lister's devotion to his work and his earnestness in teaching, gave him a pre-occupied and serious air; but what some thought to be a certain

aloofness in Lister was really the shyness of a child. The foundation of Lister's character was his Christian faith. In recalling memories of Lister, in reading and re-reading his letters, what impressed him most was his confidence in the continuity of life, in personal immortality. The first time he heard Lister express an opinion on this subject was at a dinner party when the conversation turned on recent speculations as to a future life. Lister said: "If I could believe that there was no life beyond this, I should have indeed little heart for any work." In the graduation address of 1876, Lister used these words, "It is our proud office to tend the fleshly tabernacle of the immortal spirit." Life, human life, in its most helpless and most hopeless and most suffering phases, was the medium in which he worked. He never believed that death ended all, or that the weak and battered tabernacle had no tenant. One of his most precious possessions was the letter Lister wrote to him on the death of Lady Lister, in which the words occurred: "May you and I so live during the rest of our time on earth that we may rejoin her;" in another letter he wrote: "It is indeed a grand thing to have hope in a future, which will surpass in its capacities, its glories, and its beauties all the good we have ever known here."

The occasion was also appropriately recognized by an exhibition of Lister relics in the Upper Library Hall of the Old University Buildings. This was largely attended by the members of the British Medical Association, whose annual meeting coincided with the Lister Centenary celebrations, and by members of the general public, and formed a very distinctive feature of the celebration. His portrait by Mr. J. H. Lorimer, R.A., his diplomas and gold medals, and the caskets containing the scrolls of the freedom of three great cities, Edinburgh, Glasgow and London were all displayed. There were also reminders of the pre-antiseptic days in a model of the old Lister ward in the Glasgow Royal Infirmary, and the old fashioned hospital chairs, tables, and instruments.

The event was further marked by the publication by the Lister Committee of a Lister Memorial Volume. This handsome publication, edited by Dr. Logan Turner is full of interest. It contains a biographical sketch of Lord Lister by Sir George Beatson. Mr. Alexander Miles has written "Before the Dawn" a description of the days of darkness before Lister came. There are also articles on "Lister as a Physiologist" and "The Influence of Lister's Work on Surgery" by Sir Edward Sharpey-Schäfer and Professor John Fraser. A very interesting feature of the production is the collection of 'Reminiscences' by former clerks, dressers and house-surgeons of Lord Lister. The volume is well illustrated by a number of etchings and photographs of Lord Lister, the houses where he lived and the hospitals in which he worked.

A tablet with a simple inscription has been placed upon the two houses occupied by Lister during his residence in Edinburgh.

LISTER'S FIRST VISIT TO AMERICA*

AT the International Medical Congress held in the city of Philadelphia in 1876, Joseph Lister, F.R.S., of Edinburgh was president of the Section on Surgery. On taking the chair, Professor Lister said:—

Gentlemen: Although I am well aware that the time of this section is exceedingly precious, I cannot refrain from expressing my deep sense of the honour I have received, an honour as great as it was entirely unexpected, in being called upon to preside over the Surgical Department of this great International Congress, sitting as it does in the chief centre of medical instruction on this vast continent. American surgeons are renowned throughout the world for their inventive genius, and boldness and skill in execution. It is to America that we owe anaesthesia, the greatest boon conferred upon suffering humanity by human means; from America came the ligature of the common iliac artery for aneurism; the ligature of the internal iliac for the same disease; the "extension treatment" by the weight and pulley for fractures of the thigh, and other injuries and diseases; the reduction of dislocation of the hip-joint by manipulation; and that model of ingenuity, which I cannot mention without alluding to the name of its inventor, Sayre's splint for morbus coxarius. These are but examples of what surgery owes to this country, and it might, therefore, well have been that some American surgeon should have been called upon to preside over this Section of the Congress. Yet I assure you, gentlemen, that highly as I esteem this honour, it is the more gratifying to me because I am persuaded that it has not been conferred on account of any special merit of my own, but in consequence of the interest felt by the profession in Antiseptic Surgery, with which my name happens to be connected. It was the circumstance of my observing in the programme of the business of the Congress, that the subject of antiseptic surgery was to come on first for discussion, that led me to cross the Atlantic; and I should be pleased, indeed, if the discussion which is about to take place should have the effect of strengthening the belief of the profession in the truth, the value, and the practical application of the principles of antiseptic surgery."

The first paper presented was one on Antiseptic Surgery, by John T. Hodgen, M.D., of St. Louis. A lengthy discussion followed in which, among many others, two Canadian surgeons took part.

Dr. J. A. Grant, of Ottawa, said: For many years we used cold-water dressings at the Ottawa Hospital, with great success, yet failed to

* Abstract from the Transactions of the International Medical Congress, Philadelphia, 1876.

obtain results equal to those secured by Prof. Lister. I, therefore, made a visit to Edinburgh, and was fully convinced of the superiority of the antiseptic method. I was particularly attracted by the extreme care and cleanliness which characterized all of Prof. Lister's operations.

Dr. William Canniff, of Toronto, Canada, said: It is, I believe, very generally acknowledged that the air is inhabited by various forms of germs—organisms possessing different degrees of vitality, but it remains a question whether putrefaction is due to the operation of these microscopic organisms. Dr. Hodgen's first proposition states that "putrefaction may and does occur in the solids and liquids of the body, both with and without the direct contact of germs found in the air or water." Well, if that is the case, I submit that the doctrine urged by Prof. Lister is undermined.

Dr. Hodgen said: I did not intend to convey the meaning that germs are not present in all cases of putrefaction. The organisms may be introduced to the part through the blood.

Dr. Canniff said: Then what is the use of applying to a wound or open abscess means to form a barrier to the ingress of germs? If organisms can enter the system through the lungs, or any other mucous surface, and find their way to a certain part to work mischief, it is entirely futile to adopt any procedure to prevent their action. I should like to ask the advocates of the germ theory if they hold that organic matter can never putrefy without the operation of air germs. Because if it ever does, it would be difficult in any given case of putrefaction to show that this was not a simple change in the elements composing the dead animal matter. My own experience is such that I find it impossible to entertain the doctrine of germ putrefaction. I may say that the practice recommended by Prof. Lister has not been adopted in the Toronto Hospital; his doctrine is not as yet acted upon; and I feel safe in saying that the success attending the treatment of wounds in that Institution is not exceeded by that in any other.

In speaking of the treatment pursued in the Toronto Hospital I do not intend to convey the impression that the agents called antiseptics are not used. They are constantly employed for purifying tissue, not with the view of destroying or preventing the action of air germs, but to arrest or prevent putrefying decomposition due to chemical changes. In conclusion, I would say that I believe that everything, almost, depends upon cleanliness in the management of wounds; and I believe that the success which has been obtained by those who practice according to Prof. Lister's theory, is greatly due to the cleanliness which that practice secures. Next to cleanliness, I think that the maintenance of rest is valuable; physical and physiological rest. Rest after the evacuation of an abscess will often secure an early adhesion of the walls of the collapsed sac. Pressure again is an important element in the treatment of wounds so as to press away fluid in the part, and to prevent feeble

circulation or stagnation of blood in the tissues which have to supply the reparative material. And lastly, attention must be given to the constitution and to the surroundings of the patient. Is it not to be feared that the particular treatment advised by Prof. Lister tends to divert the attention of the surgeon from these essential points?